ANNUAL REPORT

OF THE

Department of Agriculture

OF THE

PROVINCE OF ONTARIO

1926

5- MAR 1928
AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE LIBRARY COIMBATORE
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HON. J. S. MARTIN, MINISTER OF AGRICULTURE

ONTARIO

TORONTO

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CONTENTS

Report of the Minister of Agriculture.

Report of the Agricultural College and Experimental Farm.

Report of the Agricultural and Experimental Union.

Report of the Ontario Veterinary College.

Report of the Beekeepers' Association.

Report of the Entomological Society.

Report of the Fruit Growers' Association.

Report of the Horticultural Societies.

Report of the Agricultural Societies.

Report of the Vegetable Growers' Association.

Report of the Women's Institutes.

Report of the Statistics Branch.

Report of the Agricultural Development Board.

Ontario Department of Agriculture

REPORT

OF THE

Minister of Agriculture

Province of Ontario

FOR THE YEAR ENDING OCTOBER 31, 1926

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

REPORT

OF THE

Minister of Agriculture for Ontario
1926

To His Honour W. D. Ross,
Lieutenant-Governor of the Province of Ontario.

May It Please Your Honour:

I have the honour to submit the Annual Report of this Department for the fiscal year ending October 31st, 1926.

Climatically the season has been a somewhat unusual one. In many sections of the Province it was marked by very excessive rainfall. This affected the growing season, but it particularly affected the harvest season. The continuous rains throughout the fall months have few parallels in the records of the Province. This was particularly true in the South Western Counties. Some sections and some crops were more fortunate than others and, on the whole, the returns were just a little bit better than the previous year, as shown by the official figures of agricultural values:

	1925	1926
Field crops	$250,466,000	$261,264,000
Farm animals	58,041,000	62,156,000
Wool	1,207,000	1,084,000
Dairy products	100,968,000	93,915,000
Fruits and vegetables	22,365,000	18,347,000
Poultry and eggs	31,648,000	32,233,000
Fur farming	500,000	580,000
Maple products	1,716,000	1,954,000
Tobacco	5,276,000	5,540,000
Flax fibre	750,000	450,000
Clover and grass seed	2,822,000	4,458,000
Honey	1,400,000	500,000
	$477,159,000	$482,481,000

As to legislation, the most important item of the past session was the passing of The Dairy Products Act. This Act includes the provisions formerly contained in The Dairy Standards Act and a number of new provisions as well.

It provides for supervision of the erection of new cheese factories or creameries, for the grading of cream and for the granting of certificates to cheese and butter-makers. In addition, previous important provisions, such as the selling of milk and cream on a basis of its fat content and the safeguarding of tests, are continued. It is proposed to enforce this legislation gradually, but as rapidly as the campaign of education, which is being carried on, would seem to indicate to be desirable. The grading of cream has become an economic necessity, because high quality butter can only be made from high quality raw material. High quality raw material can only be expected if it is paid for according to its quality. These legislative features, therefore, will strengthen the work of the Department in trying to maintain and increase the standard of Ontario's dairy products. Good progress has already been made in this connection.

Under the different heads under which the Department is organized a review of the work of the year will be found. It is gratifying to note the increasing demand being made upon the Department by the farmers of the Province for information in all branches of activity.

All of which is respectfully submitted.

JOHN S. MARTIN,
Minister of Agriculture.

ONTARIO AGRICULTURAL COLLEGE

The following are the figures which show the attendance in the different courses during the past year:—

General Course	307	
Specialists in General Course Work	5	
Dairy Courses	213	
Stock and Seed Judging	67	
Poultry Raising	46	
Horticulture	152	
Apiculture	79	
Drainage and Drainage Surveying	4	
Farm Power	43	
Spraying	35	
Short Course for English Immigrant Boys	28	
		879
Domestic Science (at Macdonald Institute)		408
Girls' Conference (Junior Women's Institute)		214
Summer Courses:		
High School Teachers—1st year, 32; 2nd year, 35	67	
Public School Teachers—1st year, 74; 2nd year, 64	138	
		205
Total		1,706

ANALYSIS OF COLLEGE ROLL (GENERAL COURSE) 1926

From Ontario

Algoma		Kent	5	Prescott	
Brant	10	Lambton	8	Prince Edward	2
Bruce	6	Lanark	5	Rainy River	1
Carleton	19	Leeds	2	Renfrew	1
Dufferin		Lennox and Addington	1	Russell	1
Dundas		Lincoln	14	Simcoe	7
Durham	2	Middlesex	12	Stormont	1
Elgin	6	Muskoka	2	Temiskaming	1
Essex	6	Nipissing	1	Thunder Bay	6
Frontenac		Northumberland	2	Victoria	1
Glengarry	2	Norfolk	3	Waterloo	5
Grenville	4	Ontario	1	Welland	5
Grey	5	Oxford	11	Wellington	28
Haldimand	3	Parry Sound	2	Wentworth	14
Halton	6	Peel	4	York	23
Hastings	5	Peterborough	3		
Huron	6	Perth	5	Total from Ontario	257

From Other Provinces of the Dominion

Alberta	3	Nova Scotia	7	Saskatchewan	3
British Columbia	8	Quebec	2		
Manitoba	1	Prince Edward Island	2	Total from other Provinces	28
New Brunswick	2				

From Other Countries

China	1	Ireland	1	Spain	1
Cuba	1	Jamaica	2	U.S.A.	2
England	11	Newfoundland	1		
India	1	South Africa	1	Total from other Countries	22
				Total	307

AGE AND RELIGIOUS DENOMINATIONS

The limits of age in the General Course, 1926, ranged from 18 years to 36 years. The average age was 22.

Religious denominations of students registered for the fall term were:

Anglican	75	Jewish	1	Roman Catholic	8
Baptist	23	Lutheran	1	United Church	152
Disciples of Christ	1	Mennonite	1		
Greek Orthodox	2	Presbyterian	43		

ANIMAL HUSBANDRY AND FARM DEPARTMENT

The summer of 1926 was one of the wettest on record and all crops suffered as a consequence. Alfalfa winter killed to some extent and hay was only a fair crop. Spring grains were scarcely up to average and oats rusted badly. Corn was a good crop, though late, and mangels produced abundantly. Turnips yielded only about fifty per cent. of a full crop due to the ravages of aphis and the excessive moisture. A nicotine dust spray was tried on eight acres of turnips and successfully killed the aphis at a cost of $10.50 per acre for material. All crops were successfully harvested and fall plowing completed.

No horses were purchased during the year. Two Percheron foals were raised. Work on horse maintenance costs was continued.

The beef cattle herd was maintained at a high standard throughout the year and a new sire was purchased at $675 to head the Shorthorn herd. Herd maintenance cost records were continued.

The dairy herd continues to improve and the average quality of the lot is of a high order. In addition to records on production and rearing costs some valuable work on veal calf costs was carried through. All cattle in both the dairy and beef barns were entered in the Federal accredited herd system and passed a clean test in July.

Never have the sheep produced more or better lambs. Eight breeds were maintained for classroom purposes.

It was a great year for hogs. Prices remained firm and returns from the large herd of hogs broke all previous records. Chief among a number of experiments under way is an investigation into the causes of losses in cold weather litters. A university graduate in biology is working on the problem.

During the year, Bulletin 299, on The Bacon Hog was revised and published as Bulletin 320. Bulletin 274 on sheep was also brought up to date.

The annual sale of surplus stock drew a record crowd and, considering conditions, was a great success, totalling over $9,000. Hogs and dairy cattle were in keenest demand.

The College Judging Team stood second at the National Dairy Show at Detroit in twenty-seven teams, only a few points behind the winners and at the Royal Agricultural Winter Fair in Toronto, were first, scoring 330 points more than their closest competitor, standing at the top in horses, beef cattle, dairy cattle and swine, with high man in dairy cattle and in swine. Results are not yet in from Chicago.

FIELD CROP EXPERIMENTS

Under the Field Husbandry Department, the experimental work which has developed to an extensive scale, has been maintained, as well as other duties discharged.

The best varieties of nearly all the leading farm crops of Ontario have been originated at the Ontario Agricultural College by means of hybridization and selection. In a new country there is a tendency towards decreasing yields as time advances unless fertility is added to the farms from outside sources. In Ontario, however, it is interesting to know that there has been a gradual increase in acre yields in some of the principal farm crops. Based on reports of the Ontario Department of Agriculture, the following table showing average yields of grain in bushels per acre per annum for the whole Province is both interesting and suggestive:—

Crops	1882-1901 (20 years)	1902-1921 (20 years)	1922-1925 (4 years)
Oats	34.1	36.5	38.6
Barley	25.8	30.2	32.4
Winter Wheat	20.0	23.2	26.3

From this as well as from other information it is very evident that the introduction by the College of such varieties as Siberian, Banner, O.A.C. No. 72, O.A.C. No. 3 and O.A.C. No. 144 oats; Mandscheuri and O.A.C. No. 21 barley; Dawson's Golden Chaff and O.A.C. No. 104 winter wheat has had a very decided influence on the increase in acre yields throughout the Province. It is estimated that these increases in acre yields for the three crops here enumerated would amount, when valued at average market prices, to upwards of $200,000,000 in the last two dozen years.

Some of the other crops on which the College has conducted plant breeding work have also increased while a few including some minor crops such as field carrots in which no plant breeding work has taken place, have actually shown a decrease in acre yields throughout Ontario. From experiments conducted at the College previous to the introduction of the new varietes of high merit it was fully expected that these would have a decided influence in the improvement of both the quality and the quantity of Ontario's field crops. The returns should be even greater as the newer and better varieties become more generally grown on all of the farms.

BIG DEMAND FOR INOCULATION

In the campaign to encourage the growing of alfalfa, carried on during the past spring, special emphasis was laid on the value of inoculation. The result was an exceptionally heavy demand on the Bacteriology Department for bacterial cultures for this purpose. This demand was more than twice as large as any previous year and it incidentally resulted in a revenue which more than offset the entire cost of the Department. The number of cultures sent out was as follows:—

For inoculating	Alfalfa Seed		10,861
"	"	Sweet Clover Seed	1,617
"	"	Red Clover Seed	621
"	"	Alsike Clover Seed	204
"	"	Field Beans "	67
"	"	Field Peas "	410
"	"	Soy Beans "	190
"	"	Vetches "	22
"	"	Sweet Peas "	46
"	"	White Clover "	15
			14,053
Cultures returned by Agricultural Representatives			497
			13,556

Lactic Cultures Prepared and Sent Out:

Escherichia acidi lactici	216
Lactobacillus bulgaricus	27
Lactobacillus acidophilus	12
Total	255

Another matter in which the Department rendered excellent service was in the examination of samples of well water. Altogether 114 samples were sent in and of these over eighty per cent. were condemned as being unfit for drinking purposes. It is evident, therefore, that this service is of great value to the farmers of the Province and should be available in any cases where the water supply is doubtful.

CHEMISTRY DEPARTMENT

Soil work has been carried on during the year quite extensively along several lines.

Three bulletins have been issued: "Soil Acidity and Liming," "Lime and Phosphate," which deals with the results obtained from three farms in each of twenty-four counties, on which phosphates were used on the wheat crop and lime on clover, "Soils and Fertilizers," which treats of the maintenance of soil fertility by the use of green manures and fertilizers.

Demonstration plots have been continued, giving very instructive results in the use of lime and potash. The Canadian Canners and the Dominion Sugar Company are co-operating in the work, with reference to matters in which they are particularly interested, the former as to canning crops and the latter as to sugar beets.

Much work has also been done in regard to the fertilizer requirements of the potato crop and results will be issued on the basis of six years' experiments.

Soil survey work has been continued in South Western Ontario. Special interest in the growing of tobacco is accompanied by a demand for information as to the soils which are suitable for this purpose, especially the soils which are suitable for the growing of flue-cured tobacco. The soil survey work has already been of much value in this connection and will probably be of still greater value when it is completed.

Baking School

Some time ago, the commercial bakers, as represented by their organization, The Bread and Cake Bakers' Association, offered to erect a school for giving instruction in commercial baking, if the Government would undertake its maintenance and operation. This offer was accepted and as a consequence

the building has been in progress of erection during the past year. It is a splendid, compact, well-equipped building and it is being called "The Trent Institute," in recognition of the special efforts of Mr. E. W. Trent, the Secretary of the Association, in carrying through the plan to completion. The work which the Chemistry Department has carried on in the past, of testing flour and otherwise assisting the baking industry, will be continued from this building and in addition, courses of instruction will be given to those taking up commercial baking throughout the Province. It is expected the building will be ready for operation during the coming winter and that a start will then be made on courses of instruction.

POULTRY DEPARTMENT

The year was unusual in that hatches in general were poor, and the crop of chickens rather late. The prices for both poultry and eggs have been well maintained. The dull weather and the general lack of sunshine, throughout the winter and spring, may have had much to do with the early unsatisfactory hatching season.

The hatching and rearing at the poultry department has never been better than it was this year. There may have been several causes, but the following are worthy of attention:—

Milk as a protein source, as compared to beef scrap or tankage, has for a number of years given better hatching eggs.

The addition of two per cent. of cod liver oil to the mash has given better hatches and stronger chicks.

Old hens, or hens from laying competitions, that have made good records, are at times doubtful breeders, but if given from six to eight weeks' rest and abundance of green feed and free range, usually make the very best of breeders.

The demand for instruction in the culling of poultry continues to increase from all parts of the Province. Work was carried on along this line as extensively as facilities would permit. An effort is being made to train persons in each county to do culling so that more people can have their flocks relieved of non-productive hens.

Turkey Farm Established

For some years past it has been noticeable that turkey raising has been on the decline in this Province. Statistics show that in 1898, there were over 1,000,000 head of turkeys carried in Ontario, while in 1925, the number had been reduced to about 480,000. At the same time the number of other poultry carried has greatly increased.

In view of this fact it was felt that some further attention to the problems of poultry raising should be inaugurated. No doubt the prevalence of blackhead disease has been one of the factors resulting in the decrease of turkeys. Hence one hundred acres of land was purchased in Norfolk County, to be operated as a turkey farm. It will be under the direction and supervision of the poultry department of the College. It is proposed to test methods of prevention of disease, to compare the economy of raising turkeys in confined runs, alternative runs and free range and also artificial rearing, compared to natural rearing. In this way it is hoped to be able to meet the rapidly increasing demand for information on the old subject of turkey raising, which has been made upon the poultry department in recent years.

A start was made during the past summer. The land secured is of a sandy nature, rather low in fertility but with considerable grasshoppers in the district. As a beginning approximately two hundred turkeys were hatched in incubators at the College and then moved to the turkey farm about June 20th, where they were reared around coal burning brooders. They grew very well and only one was lost by disease. Crows, hawks and other pests took a few but the total loss from all causes would not be greater than ten per cent. The turkeys were started on sour milk curds, dried off with middlings, with two per cent. of cod liver oil added to the mixture. There was abundance of tender green feed and gravel was always available as a source of grit. The birds made very satisfactory progress during the season.

AGRICULTURAL ECONOMICS DEPARTMENT

This year marks the completion of the largest volume of research work on a variety of economic problems of Ontario agriculture that this department has yet attempted. The ground thus covered is partially indicated by the following list of publications issued during the year:

(a) The Marketing of Fluid Milk in Ontario.
(b) Marketing Ontario Tobacco.
(c) Tobacco Farming in South Western Ontario Involving a Survey of 250 Tobacco Farms.
(d) Cost of Making Creamery Butter in Ontario.

In addition the department inaugurated a comprehensive study of the revisions in farm practices that will inevitably be caused by the ravages of the corn borer in South Western Ontario. This project demands a practical determination of the crops that may profitably be substituted for corn in this area. This problem involves an examination of the following economic phases:

(a) The contraction in corn acreage to meet obligatory clean-up measures.
(b) The marketing possibilities of possible substitute crops; tobacco, sugar beets and canning crops.
(c) The labour resources, actual and potential, for the changed farm methods and practices.
(d) The possible modifications in live stock production and in common farm crops not directly affected by the borer.

A survey of 600 farms to procure essential data on sections (a) and (d) above has been completed and the other sections of the study are so rapidly nearing completion that a report will be issued early in the new year.

BOTANY DEPARTMENT

In addition to the regular academic work and correspondence of the department, the following investigation and extension work was carried on during the past year:

Spray service in the Province of Ontario.

Special investigations into the plant disease problems of the Essex Peninsula.

Experiments concerning the effects of various seed disinfectants in the control of cereal smuts.

Experiments in the prevention of rhizoctonia or black scurf of potatoes.

Investigations concerning the strains of canning peas resistant to root rot and experiments for the control of this disease.

Experiments for the control of onion smut.

A Uniform Rust Nursery conducted in co-operation with the Office of Cereal Investigation, United States Department of Agriculture, Washington, D.C.

Co-operative experiments in weed eradication.

Experiments in co-operation with the Department of Entomology to determine whether financial gains are to be secured from spraying commercial vineyards for the control of insects and fungus diseases and to determine the time and number of applications for best results.

Purity tests of clover and grass seed for farmers and seedsmen.

THE PROVINCIAL APIARIST

With a largely increased appropriation, attention was again directed to the work of combating foulbrood among the bees of the Province. A number of sections were chosen on which work was specially concentrated, with a view to cleaning up specified areas. In addition, regular apiary inspection was carried out.

The following is a statement of the areas where the clean-up system was carried on during the past season:

COMPARISON BETWEEN 1925 AND 1926

*Areas where clean-up system was carried out in 1925.

County	Colonies Examined	American Foulbrood	Colonies Treated	Colonies Destroyed
Peterborough	1,256	130	0	130
Hastings	1,519	173	0	173
Northumberland	1,502	282	11	271
Durham	641	32	0	32
Prince Edward	85	0	0	0
Totals	5,003	617	11	606

SAME AREAS, 1926

County	Colonies Examined	American Foulbrood	Colonies Treated	Colonies Destroyed
Peterborough	1,235	9	0	9
Hastings	678	0	0	0
Northumberland	3,061	86	0	86
Durham	169	1	0	1
Prince Edward	25	0	0	0
Totals	*5,168*	*96*	*0*	*96*

*This report does not include Townships of Hungerford, Elzevir and Madoc in Hastings County or Clarke, Darlington and Cartwright in Durham County, as this territory was not worked in 1925 for lack of time and funds. Complete summary is shown in work completed in 1926 apiary inspection.

Through a misunderstanding treating was allowed for a while in one area in Northumberland County last year. Fifty-eight of the eighty-six diseased colonies were found in this section this year.

Thus far this year $4,161 has been received from beekeepers for registration of apiaries.

The following is a complete summary of the apiary inspection work for 1926.

SUMMARY OF APIARY INSPECTION, 1926

County	Colonies Examined	American Foulbrood	Colonies Treated	Colonies Destroyed
Brant	130	69	...	77
*Bruce	1,609	167	91	90
*Dufferin	289	5	...	5
*Durham	1,101	91	...	91
Elgin	548	139	4	71
Frontenac	308	1	...	1
Grey	1,489	125	41	63
*Haldimand	526	19	...	10
Halton	78	6	...	6
*Hastings	2,556	477	...	477
Huron	4,597	138	18	119
Kent	527	61	...	41
*Lambton	710	32	...	25
Lanark	1,148	106	...	85
Leeds	59	3	...	3
*Lennox and Addington	545	9	...	9
Lincoln	479	13	4	9
*Middlesex	1,507	877	...	879
Norfolk	448	189	...	10
*Northumberland	3,061	86	...	86
*Ontario	1,219	123	15	95
*Oxford	731	23	1	16
Peel	840	74	5	43
Perth	307	12	...	12
*Peterborough	1,256	9	...	9
Prescott	171	...	...	...
*Prince Edward	25	...	...	...
*Renfrew	581	21	...	10
*Simcoe	1,475	245	102	121
**Temiskaming*	243	...	...	...
*Victoria	1,163	106	...	106
Waterloo	952	38	15	22
*Welland	700	61	...	61
Wellington	1,318	81	4	52
*Wentworth	3,911	314	...	275
York	3,759	414	104	205
Totals	40,366	4,134	404	3,184

*These counties are in the clean-up area for American foulbrood or have petitioned the Department to come in during the 1927 inspection season.

Experiments were carried out in the chemical treatment of foulbrood with formalin water. There were in all ten experiments, in which conditions were slightly varied. Practically one-half of these gave negative results, but as excellent results were secured in other cases, the experiments will be carried on another year.

During the year, 1,953 Italian queens were distributed to members. There were eighteen apiary demonstrations held.

The past winter and spring proved very unfavourable and as a consequence it is estimated that probably 50 per cent. of all the colonies in the Province were killed or so weakened that they were useless for honey gathering.

ONTARIO VETERINARY COLLEGE

During the 1925-26 session of instruction there were a total of sixty-six students in attendance. Of these, twenty-one were in the first year class, twenty-one in the second year class, twelve in the third and twelve in the fourth. The latter were graduated with the degree of B.V.Sc., conferred by the University of Toronto at a special convocation.

The session which commenced last fall shows sixty-seven students on the register, so that the attendance seems to continue fairly normal around these figures. The requirements for admission, being now on a basis of matriculation, are being maintained and there is a very noticeable improvement in the type of graduate being sent out from the institution. Probably at no time was a more thorough and scientific course of instruction given than at the present time.

The research and investigation work and the extension work all seem to be on an increase in accordance with the demand of the times. Research work is of value both to the students taking the course at the college and to live stock owners throughout the country in general. The demand for assistance in regard to poultry diseases has been especially great and hundreds of specimens have been sent in to the college. During the year, work has been done on the subjects hereinafter enumerated and details of this work may be found in the report of the college which is available for distribution.

Sterility cases in cattle.
Intersexuality in mammals.
The black fox industry in Ontario.
Pullorum infection in poultry.
Bacteriophage experiments.
Experiments on the disinfection of eggs and incubators.
Veterinary science in Japan.

In its extension service the college naturally works as far as possible in co-operation with the practising veterinarians throughout the Province. Veterinary surgeons and owners of animals are now frequently forwarding specimens to the college for laboratory diagnosis. A detailed laboratory report is sent back as promptly as possible in order to assist in the detection and the control of the disease. In poultry alone approximately 20,000 blood serum examinations have been made during the year. There has been a very considerable demand as well for assistance in controlling fox diseases. This demand is another index both to the growth of the fox industry in the Province and to the extension and application of veterinary science. About 5,000 doses of abortion vaccine have been prepared and distributed to practising veterinarians, in order to comply with the demand of owners to have their cattle vaccinated for infection abortion.

In its Clinical Department the college applies surgery as well as medicine and a very great deal of attention has been paid to this department. Here, also, much time has been devoted to investigation of abortion and sterility in cows. Many valuable animals have been treated for the latter trouble and have been restored to usefulness.

PUBLICATIONS AND STATISTICS BRANCH

The work of compiling agricultural statistics was carried on in co-operation with the Federal authorities. The results are published from time to time as completed.

The distribution of the annual reports has been continued and the following are the figures of the numbers printed for distribution:—

Minister's Report	3,000
The Ontario Agricultural College	2,500
The Experimental Union	50,000
Agricultural Societies and Field Crop Competitions	14,000
Horticultural Societies	24,000
Vegetable Growers' Association	5,000
Ontario Veterinary College	4,000
Agricultural Development Branch	3,000
Stallion Enrolment Board	3,500
Agricultural Statistics	27,000
Fruit Growers' Association	4,000
Entomological Society	3,000
Beekeepers' Association	4,000
Women's Institute	30,000
Total	177,000

The following crop bulletins have been printed for distribution:—

165	December, 1925	35,000
166	April, 1926	3,000
167	May, 1926	3,000
168	August, 1926	3,000

Other bulletins printed for distribution were:—

*218	Birds of Ontario	6,000
*252	Preservation of Food: Home Canning	20,000
*274	Sheep	12,000
*301	The Brood Sow	12,000
*313	Soil Acidity and Liming	20,000
314	Vegetable Gardening	40,000
315	Plum Culture	12,000
316	The Cherry	15,000
317	Bee Diseases	12,000
318	Currants and Gooseberries	15,000
319	Nursery Stock Identification	15,000
320	The Bacon Hog	25,000
321	Lime and Phosphate	30,000
322	Soils and Fertilizers	45,000
	Total	279,000

Circulars were printed for special distribution as follows:—

48	Hardy Alfalfa	75,000

Circulars without serial number:—

Corn Borer Act and Regulations	9,000

*New edition.

AGRICULTURAL AND HORTICULTURAL SOCIETIES BRANCH

AGRICULTURAL SOCIETIES

The value of the agricultural societies of Ontario to the Province whether it be the holding of exhibitions, conducting field crop competitions, the maintenance of live stock or any of the other lines which fall under their supervision, is very great from both an educational and financial standpoint. Improvement in live stock and farm products is their aim and has been during the century and a half that has elapsed since exhibitions were first organized in Canada.

Owing to bad weather conditions many fairs in 1926 suffered heavy losses in gate receipts. It required all the appropriation of $10,000 to partially meet the claims in this connection.

Marked improvement has been shown in the exhibits of live stock, particularly in the cattle and swine classes and larger prizes are being offered for hogs of the bacon type, with a corresponding increase in the number of entries.

The department has prepared and recommended a standard prize list covering all classes shown at Ontario's fairs and exhibitions. This list was unanimously endorsed by the Ontario Association of Fairs and Exhibitions, and copies have been sent to every secretary and it is meeting with the approval of all the societies. It may be modified to suit the conditions of the smaller ones.

Each year we have a greater number of applications for departmental judges from societies. Two hundred and sixty applied for judges in 1926 and 1,190 judges were provided for this work.

The electrotypes of standard breeds which we prepared for use in prize lists have met with the approval of the officers of a number of Agricultural societies. They can be purchased for the small sum of seventy cents a piece. Two hundred and forty-four electros were furnished to societies during the year just closed.

FIELD CROP COMPETITIONS

Continued interest is being taken in the standing field crop competitions, and the rules and regulations have been improved from time to time to meet changing conditions. These competitions were organized in 1907, at which time there were one hundred named varieties of oats distributed in different sections of the Province. Last year the number was reduced to less than a half dozen of proved and tested varieties.

The combined field crop and threshed grain competitions are proving a valuable asset to the farmers of this province, who are discovering the value of seed properly cleaned and graded and of a high standard of vitality, and as the time goes by, appreciate the action of the department in introducing and demonstrating the value of up-to-date seed cleaning plants.

At the Royal Winter Fair and Canadian National Exhibition, the competitors from the field crop competitions had on display the finest grain exhibit ever shown in Canada.

HORTICULTURAL SOCIETIES

Steadily and surely the horticultural societies of Ontario are extending their work of urban and rural beautification from Kenora to Glengarry. There are now 270 branches in the Province with an approximate membership of 70,000. Twenty-eight new societies were organized in 1926 and a large number of applications are already in for 1927. The expenditure of these societies for bulbs, plants, shrubs and flowers, were, for the year just closed, $150,841.84. The legislative grant is $20,000. The services of fifteen lecturers were available, who delivered valuable educational lectures in different parts of the Province and a large number of flower shows were held which were attended by interested crowds.

Substantial prizes were offered by the Ontario Horticultural Association for the greatest improvement during the year of cheese factories and their surroundings. This splendid work was inaugurated by one of our enterprizing farm journals, and was heartily supported by the branches of this association in different parts of the Province. In the past these food-producing centres and their surroundings, visited as they are daily during the summer season by hundreds of farmers, were far from being as well kept as they should be. A new era has dawned, and, in many sections the men in charge of these institutions are planting trees and shrubs and vines, and beauty now, instead of ugliness, prevails. Where this good work has been inaugurated, the farmers who visit these improved factories are catching the spirit of the beautification of farm homes.

As a result of what is being done all over the Province many rural horticultural societies have been organized and are doing excellent work.

ONTARIO VEGETABLE GROWERS' ASSOCIATION

Many new branches of this organization have been formed and greater interest than ever has been taken in the work of this association. In the year gone by the surroundings of the homes of vegetable growers have been somewhat neglected, but since garden competitions for the members of this association have been organized, a marked change is shown, since 40 per cent. of the score card is allowed for the care and beautification of home surroundings. The competitions for six different kinds of vegetables in the local branches have proved invaluable. Substantial prizes are offered by the Canadian National Exhibition for competition among the branches and last year these proved to be one of the biggest drawing cards in the Ontario Government Building. It is expected that at least twenty branches will compete in 1927.

ONTARIO PLOWMEN'S ASSOCIATION

Never before in the history of Ontario has there been such an interest taken in better cultivation of the soil, good plowmanship, and better seed beds than in 1926. A large number of new branches were formed in different sections of the Province and among the pioneer settlers of Northern Ontario good work is being accomplished by the branches formed there.

In 1925, at Brockville, 210 plowmen entered this great contest, and in 1926 at Lundy's Lane 243 plowboys "drove their venturous plowshares to the steep." The Niagara Falls demonstration was the largest yet held. On this famous battle ground, one hundred years ago, the embattled farmers of Ontario fought for their freedom under the British flag and victory perched on the banners that flew

over "the thin red line." The scene was changed in October, 1926, when in friendly rivalry Canadians and their brethren across the now settled line contested for the magnificent trophies offered by the Ontario Plowmen's Association and their friends for the best work done by the farmers of an adjoining brotherhood, and in peace as well as in war Canadian plow boys were again victorious. Upwards of seventy-five thousand spectators visited during the four days of this great International Plowing Match and Farm Machinery Demonstration. The work of all the different up-to-date types of farm machinery and appliances used in Canadian farm homes was demonstrated. One feature of this demonstration was the exhibit of farm machines in use 150 years ago, the sickle and flail were shown side by side with the great harvesting and threshing machines of the twentieth century. The slow moving oxen were seen at work in close proximity to the steady step of the Clydesdale and the latest models of tractor power machines. It was indeed an inspiring sight. The tented city that housed the machines extended for three-quarters of a mile. The work of the Ontario Plowmen's Association is a valuable one, and receives the hearty approval of both rural and urban citizens. Over $4,000 in prizes are offered in the different plowing competitions.

ONTARIO FIELD CROP AND SEED GROWERS' ASSOCIATION

This association has recently been re-organizedand has a substantial membership and its members are becoming interested in the production of seed grain. The officers of this organization were the prime movers in suggesting to the department the benefits that would accrue from sending out a seed cleaning train to the different parts of the Province to demonstrate to the farmers the advantages of up-to-date seed cleaning machinery. Many thousand interested farmers visited the train as it passed through Eastern and Northern Ontario in 1926 and approximtely 10,000 bushels of grain and clovers were cleaned, and a number of farmers have grouped together and purchased seed cleaning plants after viewing the work done on the seed train. For 1927 a similar train has been equipped and will stop at forty-six stations, starting in Welland County and finishing in the County of Peel on April 9th. The train is composed of a lecture car in which at each stop are delivered lectures. In another car the best varieties of grain and clover are exhibited. A third car contains several of the newest types of cleaning machines which are in continuous operation from 9 a.m. to 5 p.m. Arrangements have been made with the farmers at the different points where the train stops to bring in from seventy-five to one hundred bushels of grain and clover which is thoroughly cleaned and graded, which together with the screenings are taken home by those providing same. It is expected that not less than 10,000 farmers will visit this train at the forty-six stops in the Province. This is considered one of the best lines of agricultural educational work that has been inaugurated in recent years by the Department of Agriculture.

LIVE STOCK BRANCH

The work of the live stock branch during the past year has covered the usual wide field of activities and perhaps had better be given more in detail under the various projects handled.

ONTARIO PROVINCIAL WINTER FAIR

The Winter Fair held in Guelph, November 9th to 12th inclusive, 1925, was quite successful from the standpoint of excellence of exhibits. The entry in heavy horses was lighter than usual, but the exhibits, as a whole, were well up to the average. The most noticeable weakness in the Fair was from the standpoint of attendance, which was disappointing, considering the excellence of the show.

Summary of Entries and Gate Receipts, 1916 to 1925

	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
Heavy Horses	209	219	305	282	256	286	225	191	254	146
Light Horses	93	113	93	60	44	50	51	35	32	43
Beef Cattle	195	178	260	270	312	367	387	317	305	280
Dairy Cattle	114	105	134	134	74	101	99	87	38	88
Sheep	389	457	588	536	536	716	768	581	424	408
Sheep Carcasses	79	81	96	93	96	121	179	112	81	96
Wool	27	21	29	49	40	43	54	42	41	40
Swine	246	264	302	302	301	287	391	273	153	184
Swine Carcasses	38	28	45	48	34	33	134	34	45	48
Seeds	374	252	394	350	291	282	295	308	372	334
Fowls	4,123	4,588	4,730	5,066	3,918	4,154	3,817	1,570	794	1,297
Turkeys and Water Fowl	396	462	455	449	367	441	372	458	359	456
Pigeons and Pet Stock	681	997	1,002	1,072	587	715	763	378	247	227
Dressed Poultry	208	166	136	179	186	277	273	290	145	177
Gate Receipts	$4,504	$4,959	$2,770	$4,380	$7,984	$6,202	$5,286	$2,826	$2,813	$2,081

HORSE SHOWS

The following horse shows have received grants during the fiscal year, November 1st, 1925, to October 31st, 1926.

Association	Grant	No of Entries	Prize Money
Bradford	$75 00	89	$315 00
Bright	50 00	30	102 00
Drayton	50 00	22	99 50
Elora	75 00	66	126 00
Huron Central	75 00	104	555 50
Linwood	50 00	82	204 00
St. Clements	50 00	60	182 00
Toronto Open Air	300 00	379	622 80
	$725 00		

LOCAL POULTRY ASSOCIATIONS

Local poultry associations again received assistance from the department through the supplying of judges, lecturers and grants to associations during the fiscal year.

Number of Associations holding a show during the fiscal year	59
Number of Poultry Judges supplied	61
Number of Lecturers	17
Total amount of grants paid to local Associations (November 1st, 1925, October 31st, 1926)	$2,500 00
Total expenditures in connection with local Poultry Associations, Judges, Lecturers, Grants, Confederation, etc.	$4,942 02

EXTRACTS FROM ORDER-IN-COUNCIL, GOVERNING ORGANIZATION OF LOCAL POULTRY ASSOCIATIONS

No local poultry association shall be approved by the Ontario Poultry Confederation or recognized by the Minister of Agriculture until it has a paid-up membership of sixty bona-fide poultry keepers not members of any other poultry association.

Not more than one association shall be recognized in any city with the exception of cities with a population of 200,000 or more, and not more than one poultry association shall be recognized in any electoral district unless such district includes a city under 200,000, when an additional association may be recognized in such city.

STALLION ENROLMENT

During the season of 1926 there were 1,295 stallions enrolled, which is an increase of twenty-six over the season of 1925. The following certificates were granted: 138 A-1; 376 approved form 1; 626 passed form 1 and 155 defective form 2. Out of this number, 110 horses were enrolled as premium stallions for the year 1926 and ninety-five stallion owners received cash premiums on account of the season of 1925.

Premiums to Pure Bred Stallions

Premiums paid to stallions in 1926 on their breeding report for the season of 1925 is given below, which shows that $5,145 has been paid for premium horses in the Province of Ontario for 1926.

Number of In-foal Mares	Number of Stallions Qualifying	Amount of Premium Granted
20 and under	11	$25 00 each
21 to 30	18	35 00 "
31 to 40	20	45 00 "
41 to 50	15	60 00 "
51 to 60	16	70 00 "
61 to 70	8	80 00 "
71 to 80	4	90 00 "
81 to 90	1	100 00 "
91 and over	2	110 00 "

It is gratifying to note the increased interest in the horse industry during the past year. Reports from stallion owners would indicate that farmers generally throughout the Province are returning to the practice of breeding horses. The larger horse shows are demonstrating clearly the demand existing for special classes and types of horses. Heavy teams have been selling at good

prices, while horses suitable for saddle purposes have been commanding great attention. There are plenty of indications that interest in horse breeding should improve during the coming years, and while the enrolment of stallions in the Province has been increasing slowly during the past three years, the type and quality of the horses being used has considerably improved.

SUMMARY FOR THE PROVINCE OF ONTARIO SHOWING BY COUNTIES THE NUMBER OF DIFFERENT BREEDS OF STALLIONS ENROLLED DURING 1926

County	Clydesdale	Percheron	Standard Bred	Belgian Draft	Thoroughbred	Hackney	French-Canadian	Shire	Suffolk	French Coach	German Coach	Ponies & Morgans	Total Horses Enrolled
Brant	4	6	2	2	1	....	....	....	....	....	....	....	15
Bruce	30	10	8	1	....	....	2	....	....	....	....	....	51
Carleton	24	10	6	4	1	....	....	....	....	....	....	....	45
Dufferin	22	5	2	....	....	....	....	....	....	....	1	....	30
Dundas	7	7	4	....	....	....	....	....	....	....	....	....	18
Durham	22	8	4	1	....	3	....	....	....	....	....	....	38
Elgin	4	10	2	1	....	1	....	1	....	....	1	....	20
Essex	5	19	2	3	....	....	....	....	....	....	....	....	29
Frontenac	1	8	5	....	....	1	1	1	....	....	....	....	17
Glengarry	9	1	....	1	....	1	1	....	....	....	....	....	13
Grenville	3	....	3	....	....	1	....	....	....	....	....	....	7
Grey	33	10	10	1	....	2	....	1	....	....	....	....	57
Haldimand	11	7	2	1	....	....	....	....	....	....	....	....	21
Halton	2	4	1	....	2	2	....	....	....	....	....	....	11
Hastings	10	9	3	....	....	....	....	....	....	....	1	....	23
Huron	32	16	15	1	....	....	....	....	....	....	....	....	64
Kent	9	19	3	5	....	....	....	....	....	....	....	....	36
Lambton	35	9	6	1	....	1	....	2	....	....	....	....	54
Lanark	8	7	5	1	....	....	....	1	....	....	....	....	22
Leeds	9	4	4	....	....	....	....	....	....	....	....	....	17
Lennox and Addington	4	4	6	....	....	....	....	....	....	....	....	....	14
Lincoln	4	4	3	1	....	....	....	....	....	....	....	....	12
Middlesex	21	21	17	1	....	....	....	....	....	....	1	....	61
Norfolk	6	8	....	1	....	1	....	....	....	....	....	....	16
Northumberland	15	8	2	....	2	....	....	....	1	....	....	....	28
Ontario	34	2	3	1	....	1	....	....	....	....	....	....	41
Oxford	5	8	6	....	2	1	....	....	....	....	....	....	22
Peel	22	11	1	1	....	....	....	....	....	....	....	....	35
Perth	27	11	6	....	....	2	....	....	....	....	....	1	47
Peterborough	17	10	4	....	....	2	....	....	....	....	....	....	33
Prescott	6	7	1	....	1	....	1	....	....	....	....	....	16
Prince Edward	2	10	2	....	....	....	....	....	....	....	....	....	14
Renfrew	19	16	2	2	....	....	....	....	....	....	....	....	39
Russell	8	6	3	2	....	1	....	....	....	1	....	....	21
Simcoe	30	13	8	1	....	1	....	1	....	....	....	....	54
Stormont	5	3	1	....	....	1	2	....	....	....	....	....	12
Victoria	20	8	3	....	....	....	....	....	....	....	....	....	31
Waterloo	11	7	5	3	1	1	1	....	....	....	....	....	29
Welland	2	....	....	1	....	....	....	....	....	....	....	....	3
Wellington	28	6	2	....	1	3	....	....	....	....	....	....	40
Wentworth	2	4	2	1	....	....	....	....	....	....	....	....	9
York	28	17	7	2	18	4	....	....	....	....	....	....	76
New Ontario	19	24	3	1	....	....	....	....	....	1	1	....	49
Outside points	2	2	....	1	....	....	....	....	....	....	....	....	5
Total	617	379	174	42	29	30	8	7	1	2	5	1	1,295

CLYDESDALE STALLION "MAINRING"

The Clydesdale stallion "Mainring" owned by this department, after the season of 1925 was wintered at the Ontario Agricultural College where he was used for class-room purposes. He was returned in the spring of 1926 to stand for the second season at Brooklin, Ontario. During the season of 1926 sixty-three mares were bred to "Mainring."

RAM CLUBS

Work in connection with ram clubs organized through the Live Stock Branch has been carried on during the year with very satisfactory results. Dipping, docking and castrating demonstrations have been held and the marketing end has been assisted by the holding of market lamb fairs. These fairs were held at Emo, Franktown, Middleville, Manitowaning and Little Current at which points ram clubs had previously been organized. Prizes were offered for such classes as:

1—Pen of ten market lambs.
2—Pen of five market lambs.
3—Single ewe or wether lamb.
4—Breeding pen, to consist of a pure-bred ram and three grade ewe lambs, sired by the ram shown.

All lambs were graded and marked when delivered at the fair. After the judging, the lambs were sold on a graded basis.

Summary of Shows and Sales of Lambs in the Middleville and Franktown Ram Clubs, 1926

	Middleville	Franktown
Total lambs on exhibition	390	356
Number shipped	285	304
Grading as follows: Choice	142	139
Good	101	110
Heavy	7	30
Sheep	7	19
Feeders sold locally	28 (Sold in Toronto)	6

	Middleville		Franktown	
	S.P. Toronto	Net to Farmer	S.P. Toronto	Net to Farmer
Selling price: Choice	13c.	$11 06 cwt.	(Sold locally)	10½c.
Good	12c.	10 06 "		10c.
Heavy	11c.	9 00 "		9c.
Sheep	3c. to 5c.	2 45 "		4c. lb. for 12 $2 each for 7
Feeders	11c.	9 00 "		8c.
Average weight per lamb: Choice	84½ lbs.		86½ lbs.	
Good	82 "		77.4 "	
Heavy	110 "		109½ "	
Feeders	71 "		55.6 "	

HAVELOCK RAM CLUB

Number of lambs on exhibition . . . 140
Number of lambs shipped 96

	Havelock Weight	Toronto Weight
	7,905 lbs.	7,360 lbs.
Average	82.3 "	76.6 "
" shrink . .		5 2/3 "

Selling price	89 choice,	6,870 lbs. at	13¾c	$944 62
" "	4 light,	240 "	12¼c	29 40
" "	1 buck,	80 "	11¾c	9 40
" "	1 yearling,	80 "	7 c	5 60
" "	1 yearling,	90 "	10 c	9 00
	96	7,360		$998 02

These lambs were consigned through a local drover at a cost of eighty cents per lamb, he paying all expenses such as freight, feed, commission, etc. The average price to the farmers was approximately one cent per pound less than the above selling prices. Since the highest price paid at Toronto during the week these lambs were marketed was twelve cents, the farmers in the Havelock Ram Club benefited considerably by using better methods in breeding, feeding and care of their sheep.

Summary of Shows and Sales of Lambs in the Little Current and Manitowaning Ram Clubs, 1926

	Little Current	Manitowaning
Total lambs on exhibition	254	370
Number shipped	375	392
Grading as follows: No. 1	88	74
No. 2	96	102
No. 3	112	221
Longtails	79	5

	Little Current		Manitowaning	
	S. P. Toronto	Net to Farmer	S. P. Toronto	Net to Farmer
Selling price: Champion Wether	20c	Selling expenses per 100 lbs 96c	20c	Selling expenses per 100 lbs. $1.23
Choice	13c		12¾c	
Good	12¾c		12¼c	
Heavy	12c		11½c	
Longtails	12¼c		3c to 5¾c	
Top price: General run	12½c		12c	

	Little Current	Manitowaning
Average weight per lamb at Toronto: No. 1	71¼ lbs.	80½ lbs.
No. 2	70½ "	83 "
No. 3	74 "	82 "
Average shrinkage in shipment	8.75 "	7.9 "

SUMMARY OF SHOW AND SALE OF LAMBS, EMO RAM CLUB, 1926

Number of contributors	21	Grading of lambs: No. 1	114
Number of market lambs in fair	154	No. 2	12
		No. 3	28

Average weight of lambs	90 lbs.
Total sheep on exhibit	266
Total lambs shipped	191
Average weight of lambs shipped	90½ lbs.
Average shrink to Winnipeg	8.3 lbs.
Average sale price at Winnipeg	$12.50 per 100

GREY COUNTY—BOYS' SHEEP CLUB

In the fall of 1920 the Ontario Live Stock Branch purchased one hundred and thirty grade ewes and placed these with twelve boys selected by the Agricultural Representative in Grey County. These ewes were all bred to good pure-bred sires when distributed and pure-bred Shropshire rams were loaned by the department for use in these flocks during the following four years. Briefly, the purpose of forming this club was to demonstrate to the sheep raisers of the county the advantages in the use of pure sires as well as the practice of dipping, docking, castrating and co-operative marketing. At the time these flocks were placed the Agricultural Representative was beginning a campaign in this county for improved practices in sheep husbandry which has since been very successful and the work carried on by the boys in this sheep club was simply a concrete example of the practices in breeding, feeding and care which were being recommended to the sheep raisers of the county.

The boys in return for the ewes given were, by agreement, to return to the department over a period of five years a number of yearling ewes equal to the total ewes in the flock when placed, and further agreed to manage this flock according to instructions from the department. As a result of ewes being returned from the flocks placed in 1920 there have been started on a similar basis:

6 flocks in 1922—(5 flocks of 5 ewes and 1 flock of 9 ewes).
7 " 1923—(5 ewes in each).
8 " 1924—(7 flocks of 5 ewes and 1 flock of 10 ewes).
9 " 1925—(5 ewes in each).
8 " 1926—(7 flocks of 5 ewes and 1 flock of 3 ewes).

The practice being followed is that the Agricultural Representative selects each year boys from among his junior farmers, whose farms are suitable for sheep raising and on whose farms no sheep are being kept. The sheep being placed now are much superior in uniformity and mutton conformation than the original ewes distributed as there are now three and four crosses of pure-bred sires in the present ewes. The department continues supplying each flock so placed with a pure-bred Shropshire ram for four successive years after which, when the return of ewes to the department has been completed, the boy gets title to the flock and supplies his own ram.

BACON HOG CLUBS

At the beginning of the year 1926 there were 246 active Bacon Hog Clubs, distributed in thirty-five counties. During the year this number has increased by ninety-four, the number of active clubs at the close of the year being 340, distributed in thirty-eight counties and districts as follows:

NUMBER OF CLUBS BY COUNTIES

Counties	Number of Clubs	Counties	Number of Clubs
Brant	8	Muskoka	1
Bruce	10	Norfolk	5
Carleton	1	Northumberland	21
Dufferin	6	Ontario	2
Durham	1	Oxford	17
Elgin	13	Peel	4
Essex	9	Perth	18
Frontenac	1	Peterboro	5
Glengarry	2	Prescott and Russell	3
Grey	35	Prince Edward	4
Haldimand	7	Renfrew	2
Halton	12	North Simcoe	13
Hastings	19	South Simcoe	18
Huron	7	Thunder Bay	2
Kent	9	Victoria	11
Lambton	6	Waterloo	19
Lanark	6	Wellington	17
Leeds	4	Wentworth	11
Middlesex	9	York	2

To provide for replacements and to fill new applications, 127 animals were bought from fifty-three different breeders at an average cost of $49.61. Of this number three were of the Berkshire breed, four were Tamworth and the remainder, 120, were Yorkshire.

Animals were delivered to the clubs express or freight paid to the nearest railway station. In some cases the price paid was for the animal, delivered to the club. To take care of exchanges of animals between clubs and to deliver boars to clubs, 123 shipments were made at a total cost of $777.31 or an average cost per shipment of $6.23.

In sections where a number of Bacon Hog Clubs have been organized and operating for a year or more, as follow up work the Ontario Department of Agriculture, co-operating with the Dominion Department of Agriculture, assisted in the organization of special bacon hog fairs. Six such special fairs were held at the following points:

Fair	County
Mitchell	Perth
Stirling	Hastings
Colborne	Northumberland
Kitchener	Waterloo
Nelles' Corners	Haldimand
Stayner	Simcoe

In addition to financial assistance to the prize list, the Ontario Department supplied demountable hog pens and hurdles, thus making it possible to hold the fair at or near a loading station on a regular stock shipping day. The market hogs exhibited were sold by sealed tender on the day of the fair and in each case the price realized was considerably in advance of the prevailing market price for the day. Such fairs provide the hog producers in a section with an opportunity to have a competent judge sort out the desirable breeding stock. Where one or more have been held in a section the improvement in both breeding and market hogs has been very remarkable.

CO-OPERATIVE CAR SHIPMENTS OF LIVE STOCK

This is called our co-operative shipments of live stock to Western Canada and Northern Ontario. The table following will give an idea of the services rendered to Ontario breeders shipping to Western Canada for the years 1908 to 1926, inclusive:

NUMBER IN EACH SHIPMENT

Year	Horses	Cattle	Sheep	Swine	Total
1908	22	74	14	15	125
1909	25	70	84	4	183
1910	39	51	36	7	133
1911	58	51	51	18	178
1912	51	45	24	20	140
1913	47	71	107	21	246
1914	49	97	34	20	200
1915	28	104	76	8	216
1916	59	185	100	22	366
1917	70	269	196	15	550
1918	67	250	180	4	501
1919	24	154	154	4	336
1920	18	110	37	6	171
1921	1	37	19	5	26
1922	3	18	6	21	48
1923	6	32	9	28	75
1924	1	22	2	0	25
1925	1	12	11	0	24
1926	2	43	33	5	83

ASSISTANCE TO AUCTION SALES OF PURE-BRED LIVE STOCK

During the year November 1st, 1925, to October 31st, 1926, assistance has been given to twenty-three local associations that have held sales. A total of 816 cattle were sold and the total assistance given amounted to $1,992. The assistance so granted is paid at the rate of $3 per head for every animal sold, with a maximum grant to any association of $100. Inspection of the stock offered by members of these clubs has been made, where requested, by an officer of the Live Stock Branch. Such inspection previous to the sale eliminates undesirable animals.

PURCHASE OF COWS FOR NORTHERN ONTARIO

The Department of Agriculture co-operating with the Department of Northern Development, have continued the policy of assistance in purchasing cows by settlers in Northern Ontario under the policy inaugurated during the fiscal year 1924 to 1925. Cows were purchased during the summer of 1926 by settlers of the following places:

Dryden	27 cows
Emo	10 "
Hearst	15 "
Kapuskasing	16 "
Total	68 cows

	Pure Breds	Grade
Breeding: Ayrshires	17	21
Holsteins	8	19
Shorthorns	..	3
Total	25	43
Average cost: $93.27 per cow.		

LIVE STOCK EXPOSITION WINNINGS AT CHICAGO, ILL., 1926

Beef Cattle

Ontario was represented at Chicago with one herd of Shorthorn cattle owned by T. A. Russell, Downsview. In view of the fact that the Chicago is the greatest beef cattle show in America, the success of the Ontario entries is outstanding evidence that Ontario breeders rank high among the breeders of this continent.

Class	Total Entries	Ontario Prizes	Owner
Bull calved between June 1st, 1923 and May 31st, 1924	9	7th and 8th	T. A. Russell.
Cow calved before June 1st, 1923	15	5th	T. A. Russell.
Cow calved between June 1st, 1923 and May 31st, 1924	13	4th	T. A. Russell.
Heifer calved between January 1st and May 31st, 1925	24	1st	T. A. Russell.
Heifer calved between June 1st and September 30th, 1925	25	2nd	T. A. Russell.
Heifer calved between October 1st and December 31st, 1925	31	10th	T. A. Russell.
Heifer calved after January 1st, 1926	28	11th	T. A. Russell.
Cow calved before June 1st, 1923, with own calf at side, calved after October 1st, 1925	11	2nd	T. A. Russell.
Yearling herd—1 bull and 2 heifers, heifers to be bred by exhibitor	15	2nd	T. A. Russell.
Get of sire—4 animals, any age, owned by exhibitor	26	5th	T. A. Russell.

SHEEP

Breeding Classes

Breed	Ontario exhibitors	Total exhibitors	Total first prizes	Ontario competed for	Ontario Won: First	Second	Third	Fourth	Fifth	Championship	Res. Championship
Shropshire	1	15	9	9	0	1	3	3	1	0	0
Oxford	3	9	8	8	1	2	2	3	2	0	1
Lincoln	2	4	8	8	5	5	2	4	2	2	0
Cotswold	1	5	8	8	7	4	2	3	1	2	1
Southdown	4	11	8	8	7	6	4	3	4	2	2
Dorset	1	9	9	2	1	1	0	1	0	0	0
Leicester	1	3	8	7	7	3	1	0	0	2	1
	13	56	58	50	28	22	14	17	10	8 out of 14	5 out of 14

Col. McEwen won Southdown Sheep Society of England Special.

This summary shows Ontario with 23 per cent. of the total exhibitors winning 56 per cent. of all first prizes competed for, with 57 per cent. of the total championships and 35 per cent. of the reserve championships.

FAT CLASSES

Breed	Total first prizes	Ontario competed for	Ontario exhibitors	Total exhibitors	Ontario Won						
					First	Second	Third	Fourth	Fifth	Championship	Res. Championship
Shropshire....	3	2	1	16	2	0	0	0	0	0	1
Oxford........	3	3	4	7	0	2	2	1	1	0	0
Lincoln.......	3	3	4	6	3	2	1	2	0	1	1
Cotswold......	3	3	2	6	3	1	1	0	0	1	1
Southdown....	3	3	5	20	0	0	1	0	0	0	0
Leicester......	3	3	2	5	3	1	2	1	0	1	1
Grades and crosses medium wool	4	2	3	26	0	0	1	0	0	0	0
Grades and crosses long wool...	4	4	5	9	3	3	3	2	2	1	0
	26	23	26	95	14	9	11	6	3	4 out of 8	4 out of 8

This shows Ontario with 27 per cent. of the total exhibitors in the fat classes winning 60 per cent. of all the first prizes competed for, with 50 per cent. of all the championships and reserve championships.

ASSISTANCE TO EXHIBITORS AT INTERNATIONAL SHOWS

The Ontario Department of Agriculture, through the Live Stock Branch, by helping in the payment of freight and other expenses, makes it possible for Ontario breeders to exhibit at foreign shows and thereby advertise the quality of Ontario live stock.

"ONTARIO AYRSHIRE WINNINGS," NATIONAL DAIRY EXPOSITION, DETROIT, MICH., OCTOBER 6TH—13TH, 1926

Class	Total Entries	Ontario Entries	Prizes Won	Name and Address of Exhibitor
Bulls				
Calf..............	21	1	5th	H. A. Swart, Simcoe.
Senior yearling......	12	1	10th	Western Live Stock Corporation, Burlington.
4 years or over......	12	2	6th	Western Live Stock Corporation, Burlington.
			8th	Western Live Stock Corporation, Burlington.
Females				
3 years and under 4..	16	2	6th	Western Live Stock Corporation, Burlington.
State Herd..........	...	...	4th	Ontario Ayrshires.

"Ontario Holstein Winnings," National Dairy Exposition, Detroit, Mich., October 6th—13th, 1926

Class	Total Entries	Ontario Entries	Prizes Won	Name and Address of Exhibitor
Bulls				
Calf	28	3	3rd	Haley & Lee, Springford.
Junior yearling	8	1	4th	LeRoy Siddall & J. F. Gibbons, Denfield.
Senior yearling	13	1	2nd	T. O. Dolson, Brampton.
2 years and under 3	13	1	3rd	J. W. Innes, Woodstock.
4 years or over	13	1	2nd	D. A. McPhee, Vankleek Hill.
Females				
5 years or over	47	3	6th	Haley & Lee, Springford.
			9th	Arbogast Bros., Sebringville.
4 years and under 5	15	1	4th	James Rettie, Burgessville.
3 years and under 4	21	2	5th	Haley & Lee, Springford.
2 years and under 3	27	3	3rd	J. W. Innes, Woodstock.
			6th	Haley & Lee, Springford.
			9th	Arbogast Bros., Sebringville.
18 months and under 2 years	24	2	9th	J. W. Innes, Woodstock.
Junior yearling	25	3	1st	J. W. Innes, Woodstock.
			2nd	Arbogast Bros., Sebringville.
			3rd	Haley & Lee, Springford.
Calf	37	4	3rd	D. Smith & Son, Glanford Station.
			6th	D. A. McPhee, Vankleek Hill.
			10th	E. B. Durham, Smithville.
State herd	..	..	2nd	Ontario Holsteins.

THE DOG TAX AND SHEEP PROTECTION ACT

During the past session of the legislature an Act to impose a Tax on Dogs and for the Protection of Sheep was passed. In so far as this Act gives protection to sheep owners from the damages caused by dogs to sheep, it is well to note briefly a few of the more important points bearing on the procedure which must be followed if appeals are to be made from the award of the local valuer.

Every sheep owner, upon discovery of damage to his flock from dogs, should at once notify the local valuer or the clerk of the municipality of such loss. The local valuer, who examines the sheep, is required to make a duplicate report of his award in writing, one copy of which is given to the sheep owner and the other copy to the clerk of the municipality.

If either of the parties, i.e., the sheep owner or the municipal council, is not satisfied with the award of the local valuer, each has equal rights in making an appeal to the Minister of Agriculture for the appointment of an arbitrator whose award shall be final and must be paid. Such appeal must be accompanied by a deposit of $25 which will be returned if the appeal is sustained and which will be forfeited if the appeal is lost.

Copies of this Act may be obtained by writing the Director of the Live Stock Branch, Ontario Department of Agriculture, Parliament Buildings, Toronto.

During the past year eight appeals have been made under this Act, seven of which have been sustained and one lost. The appeals have come from over a great territory including Rainy River, Sudbury, Prince Edward, Victoria, Simcoe, Wellington, Norfolk and Kent Counties.

INSTITUTES BRANCH

The year 1926 has witnessed expansion and effective work on the part of the Women's Institutes with an increase in the service rendered by the Institutes Branch. Educational features bearing directly upon the feeding, housing and clothing of the family have received due consideration, while many other activities as outlined in the reports of the standing committees have received the support of the Institutes in general, of which there are now 1,047 with a membership of over 35,000.

The following extracts from reports of standing committees will indicate the breadth and importance of their work:

Education

The educational programme as submitted to the Institutes for 1926 under the headings of, "The School," "School Grounds," "The Pupils," and "The Community" has been followed with splendid results. Certain lines of activities have become fairly general: supplies for schools, first aid kits, drinking fountains, towels, victrolas, book cases, pictures, books: aiding school fairs, planting shrubs, etc. During the past year, assistance has been given by many of the Institutes to musical training in the schools, one school having employed a teacher in music at $250 per year. In another Institute $50 was spent on a manual training outfit for the use of the teacher who was qualified to give instruction. Groups of Institutes assisted in organizing classes in manual training and providing work benches, while the local School Board gave assistance and the Department of Education paid 75 per cent. of the salary of special instructor who spent his whole time among the five centres organized.

Some have bought moving picture machines and provided the community with films of an educational character, thus raising funds to carry on the general work of the Institute. Prizes are being given to girls for darning stockings and the making of dolls' dresses, and to the boys for building bird houses. Play equipment has been furnished in some centres.

The travelling libraries are being utilized to a greater extent from year to year. Not only are the Institutes looking well to the physical well-being of the children, but are taking a keen interest in educational matters in general, and are discussing with keen interest the possible benefits through organizing township schools boards.

The services offered through the Extension Department of the Universities are being utilized to a greater extent from year to year and debates and public speaking and amateur plays are resulting in increased attendance.

The Institutes' regular meetings from month to month are a forceful educational factor in making towards greater efficiency in home making in its broadest sense.

Home Economics

The work of this committee embodies the very ideals for which the Institutes were originally organized, greater efficiency in the feeding, clothing and sheltering of the family; and the Institutes find this field of more interest to-day than ever before. While the consideration of the needs of all ages is occupying the attention of the members, special emphasis is being given to the feeding of the pre-school age child, and an increasing number of Institutes are introducing the hot school lunch in the rural districts. Up-to-date literature on food values and nutrition

is being generally circulated among the members. Addresses in relation to health as well as its influence upon the character and the study of textiles receive due consideration.

Proper location of the houses, suitable plans for the farm home, re-modelling of old houses, efficiency in the kitchen, adequate and healthful heating and water systems are among the topics of general discussion.

Health and Child Welfare

The interest in Health and Child Welfare has been universal and the reports for 1926 are most encouraging. A splendid spirit of co-operation has been established among the local medical officers of health, school nurses and organizations working along health lines. The literature available through the Provincial and Dominion Departments of Health is being utilized to good advantage through all sections of the Province. The Institutes are more and more recognizing the value of preventive and constructive efforts. Many of the Institutes are devoting more and more time to child welfare, and in many centres are co-operating with Rotary Clubs and hospitals in providing treatment for handicapped children. At least one meeting a year is devoted to health in many Institutes.

Agriculture

A great majority of the members of the Institutes live on farms and are therefore keenly interested in agricultural matters in general. The officers are informed from time to time as to literature available, both through the Provincial and Dominion Departments of Agriculture, samples being furnished them. The members examine the sample copies and apply direct for those of particular interest.

The committee reports a growing interest and an ever increasing success in poultry raising, on the part of the girls and women. The culling of poultry and the grading of eggs has been of particular interest. Many are now catering to the enormous tourist trade; and where the service and accommodation is of a high standard, much success is experienced. Small fruit farming has been taken up by an increasing number of girls and women. The Institutes are taking a keen interest in school fairs and gardens and the beautification of public grounds, as well as the planting of trees and shrubs and the growing of flowers on the homestead. General cleaning up days and the care of neglected spots in towns and villages are being supported by the Institutes and they are active in many districts in extending the organization and activities of the horticultural societies.

Immigration

The Institutes are doing their part in welcoming newcomers from overseas and settlers from other districts and are absorbing them in community life and activities. The Institutes are following the advice of the committee by securing information as to new families and girls employed in homes throughout the Province from the Women's Branch, Department of Immigration, Ottawa; Colonization Department of the Ontario Government; The Employment Bureau, Toronto; Land Settlement Branch, 32 Adelaide Street East, Toronto. The newcomers find life in the rural districts much more enjoyable because of the existence of the Women's Institute.

Relief

This is one of the most important features in some districts. The Institutes are now accepting responsibility in many sections of surveying the territory covered and giving donations of food, clothing, bedding, etc., contributing to various local relief organizations supporting very generously the Children's Shelter, Sick Children's Hospital, local hospitals, personal visits and showers of fruit, candy and Christmas boxes to inmates of House of Refuge. In fact the Institutes may be considered the recognized medium through which relief work is carried on in many sections of rural Ontario. A number of centres in Northern Ontario have received assistance from Institutes in old Ontario. The policy has been to link each branch in the north asking for assistance with one or two branches in old Ontario, and from year to year supplies are provided.

Community Activities

The programme in community activities is very broad and the Institutes stand ready to co-operate in all matters which affect the community as a whole. Libraries, rest rooms, community halls are built and equipped and made community centres. Community Christmas trees, choral classes, debating societies all come in for consideration. Town improvements such as drinking fountains, bathing facilities, sidewalks, street lights are among the activities. Interchange of visits among branches, picnics in the summer and social evenings in the winter when the whole community is invited gives much needed recreation.

Legislation

Many of the Institutes have secured literature bearing upon the laws of the land and are making a study of methods of Dominion, Provincial and Municipal Governments. The members are looking carefully into laws and methods of administration affecting women and children. The guardianship of children, wills, the economic position of married women, are among the topics of special consideration. The marriage laws of Ontario as compared with other provinces and other countries are receiving due attention.

Historical Research

This committee was formed in the fall of 1925, but has already undertaken work of real interest and national value. In some counties they have already begun to compile the history of the whole county and in many Institutes a beginning has been made on local history, including individual farms, industries, public buildings, etc. A record is being made of the first settlers, their methods of living and their accomplishments, the history of the first schools and the first church in the district is being recorded. The committee suggests that a little more time be given to the study of local history, and thus gain a greater insight into the lives and thoughts of our ancestors in this country. They are proceeding on the belief that every community has a history which should be preserved.

With branches in all sections of the Province, the work of this committee should be very interesting and result in a compilation of information which has not yet been collected in a systematic manner.

Canadian Industries

This committee was also formed in the fall of 1925, and in the report presented in 1926, inquiries whether or not the members of the Institute ask for Canadian products when buying. They also asked pertinent questions as to why they buy the important articles. The members are requested to furnish a list of goods produced in Ontario or Canada that do not compare favourably in price and quality with similar foreign made articles. The visitors to the conventions were asked to pledge themselves to ask for Canadian, Ontario or British Empire products in their daily buying. The committee makes the following appeal: "Coming as most of us do from farm homes, let us with renewed faith, hope and love, do our part, small though it may seem, in adding to the ever increasing store of Canadian wealth, Canadian patriotism and international concord and good will.

Demonstration Lecture Courses

The major portion of the service rendered by the Institutes Branch is through Demonstration Lecture Courses in "Home Nursing and First Aid," "Food Values and Cookery," "Sewing" and "Millinery."

For the "Home Nursing" and "First Aid Courses" graduate nurses with experience and familiar with rural conditions and needs are employed. This course is for the purpose of enabling women in the rural districts to obtain a knowledge of how to care for the sick in the home, what to do in emergency and how to do it: how to render the best possible assistance to the doctor or the nurse; the equipment and care of the sick room; how to take temperatures, pulse and respiration and keep records; how to prevent contagious diseases; disinfecting, fumigation, etc.

In the "Food Values and Cookery" course, instruction is given and lesson leaflets furnished covering the following subjects: Vegetables, Fruits, Eggs, Milk, Cereals and Cheese, Meat, Meat substitutes, Flour mixtures, Desserts, Salads.

In the "Sewing" course, instruction is given in the class of sewing ordinarily done in the home; how to use the sewing machine; and each member of the class is expected to make one dress.

The "Millinery" course consists of practical work; each member of the class being required to make a hat, and many of them make hat shapes.

Systematic instruction along the lines indicated is very much appreciated by the women and girls of rural Ontario, who not only derive information of real value and acquire efficiency in performance through taking these courses, but are encouraged to extend their reading and take full advantage of the literature available from various sources.

During 1926 two weeks' courses were held as follows:

	Number	Total taking instruction
Sewing	122	2,924
Millinery	67	1,161
Food values and cookery	40	1,595
Home nursing and first aid	43	1,485
Total	272	7,165

In addition to the above, three months' courses were held at six points, with an average enrolment of sixty-six (66) at each place. In these courses each person received instruction in "Sewing," "Millinery," "Household Science" and "Home Nursing and First Aid."

Girls' Garment Making Clubs

There are now sixty active Garment Making Clubs in operation with a membership of over one thousand girls. Some of the groups are now completing the second year work, as prescribed in the manual furnished to the local leaders and the girls who undertake the course. This line of work has proven very effective, the younger girls acquiring information and efficiency of real worth at very little cost to the Department. Women who have done a good deal of their own sewing, and some who have had special training along that line, undertake to instruct the girls one afternoon a week, with the result that at the end of the prescribed course exhibits of work done are very creditable to both teachers and pupils. The Institutes Branch furnishes examiners and certificates are issued to those who measure up to the required standard. The course prescribed is of a thoroughly practical standard, and it is hoped that local leaders will be able to give instruction and leadership in other activities among the girls, thus placing them in a position to take full advantage of the more advanced instruction offered through the regular demonstration lecture courses.

Girls' Judging Competition

Nutrition—School lunch and menu for family in country for a day in September.

Baking—Bread and plain cake.

Good Dressing—Wardrobe suitable for girl in the country.

Sewing—House dress and making buttonhole and plain hem.

Twenty-one counties took advantage of the services of instructors in judging "Nutrition," "Good Dressing," "Baking" and "Sewing". With the assistance of the agricultural representative and in many cases, the local Women's Institute, groups of girls were given instruction in judging. This was followed by a county-wide competition, when county teams were selected to compete with the inter-county competition held at the Canadian National Exhibition. There were twenty-one of these teams, and in addition, 166 girls entered the open competition; altogether 229.

A great many girls who took advantage of the coaching in the various local centres did not enter the county competitions, but, nevertheless, received valuable instruction. This work is creating in the minds of the girls definite standards in dress, and in the choosing and preparation of food.

In the inter-county competition, the team from Haldimand County won the trophy awarded by the Canadian National Exhibition. The members of the team were:

Members of Team:	Betty Elder, Cayuga	743
	Elga Lint, R.R. No. 3, Cayuga	742
	Frances Fearman, R.R. No. 3, Cayuga	675

The contestants standing highest in the various classes in the team competition were:

Baking	Mary Dunton, R.R. No. 6, Brampton	189
Nutrition	Gladys Packham, R.R. No. 1, Caistor Centre	197
Sewing	Kate Frizzell, Bognor	196
Good Dressing	Elga Lint, R.R. No. 3, Cayuga	194

The girl receiving the highest aggregate mark in the team competition was:

Miss Betty Elder, Cayuga 743

In the open competition, the high girls in the various classes were:

Baking	Eva Graham, Simcoe	177
Nutrition	Margaret Watson, Woodbridge	194
Sewing	Alice Frizzell, Bognor	185
Good Dressing	Jessie Brown, R.R. No. 2, Thorndale	188

Junior Institutes

There are now seventy Junior Institutes in the Province, a number having been organized during the year. The membership is made up of girls from sixteen to twenty-six years of age. While the Juniors are organized on the same basis as the Women's Institutes, they stress features that are of special interest to the girls. The Junior Institutes and Junior Farmers' Associations are co-operating in many counties, in social and educational efforts. Debates, dramatics, public speaking, musical competitions, sports and community work in general are receiving attention. The Junior Institutes are generally co-operating with the local Women's Institutes. The Juniors are contributing to hospitals, children's shelters and other worthy causes and have sent supplies of clothing to many centres in Northern Ontario.

Girls' Conferences

In order that the girls who are carrying on so effectively in the Junior Institutes, and others interested in problems of special concern to the country girls, might have an opportunity of associating together, exchanging views as how best to carry on, and securing up-to-date information in the lighter forms of agriculture, and particularly the service available through the Agricultural College and the Department of Agriculture, a conference was held at MacDonald Institute, Ontario Agricultural College, Guelph, on May 5th, 6th and 7th, 1926, with 240 girls in attendance. The staff and students of MacDonald Institute arranged the programme, and the Institutes Branch co-operated in completing plans and advertising the conference.

The programme included inspection of the various departments of the college and instruction in poultry raising and bee keeping. One day was devoted to health matters and another to citizenship with community singing, physical education, amateur plays and entertainment interspersed.

A comparatively small number of girls from east of Toronto took advantage of the conference at Guelph; so a similar conference was held at Kemptville Agricultural College in October. The staff of the school co-operated with the Institutes Branch in planning and carrying out the programme. There were eighty-seven girls at this conference. These conferences did much to stimulate a keener interest and create more definite objectives on the part of the Junior Institutes.

Summer Series of Meetings

In accordance with the custom which has been followed for over twenty years now, each Institute was given an opportunity to have a lecturer from this Department attend a special meeting some time during the latter part of May or June. Over seven hundred branches took advantage of this service: in many districts two or three nearby branches joining and holding a union meeting. While the chief object of this series is to assist the officers and members in formulating plans which promise to make the work of the branch more successful the speakers were prepared to give definite instruction along lines of

practical value to the members. The subjects dealt with by the lecturers include various features of the food problem; health, largely from the preventive and constructive standpoint; agriculture for women; patriotic topics; up-to-date methods in planning and carrying on the work of the household; co-operation; home crafts; neighbourliness in its broadest sense; home beautification; assistance to the schools; how to assist the boys and girls to find their right life work; community activities; patriotism; gardening; and many other features of general interest.

District Annual Meetings

These gatherings, with official representatives from the branches throughout the district, are devoted chiefly to the presentation of reports, election of officers, and the formulating of plans for district activities throughout the year. The members of the Provincial Board attend so far as possible the district meetings in their respective subdivisions, and the Institutes Branch furnishes special speakers for a limited number of the annual gatherings. Representative women from all the branches, meeting in conference at the annual gathering, do much to stimulate a keener interest in the work and make plans for extending the work to new centres and giving assistance to those branches which feel the need of some encouragement and help from the district officers and the leaders in the stronger branches.

Annual Conventions

The ever broadening field of activities and the growing importance of the work of the Institutes, resulted in conventions being held in nine centres during the fall of 1926 as follows:

New Liskeard (Temiskaming)	October 6th, 7th.
Port Arthur and Fort William (Kenora, Rainy River and Thunder Bay)	October 12th, 13th.
Huntsville (Parry Sound and Muskoka)	October 12th, 13th.
Silver Water (Manitoulin)	October 15th.
Soo (Algoma and St. Joseph Island)	October 19th, 20th.
Belleville (Hastings, Northumberland and Prince Edward)	October 26th, 27th.
Ottawa, Eastern Ontario	November 2nd, 3rd, 4th.
London, Western Ontario	November 9th, 10th, 11th.
Toronto, Central Ontario	November 16th, 17th, 18th.

Convention committees representative of the area covered by each of the conventions co-operated with the Institutes Branch in planning programmes, making local arrangements for halls, billeting, etc., and in carrying out the programme. These annual gatherings are an important factor in stimulating a more general interest in the work and formulating plans for further activities.

The conventions in the fall of 1926 devoted a good deal of the time to outlining not only the work which was done, but details as to how to organize and carry on effectively. A representative from the Institutes Branch assisted at all the conventions. It was the unanimous opinion that the 1926 conventions were the most successful yet held.

The subdivision embracing Hastings, Northumberland and Prince Edward, held its first convention at Belleville. Chairmen of the following standing committees were appointed to report at the convention: Education, Health, Agriculture, Home Economics, Community Activities and Relief; and the following lines were dealt with in the general reports: Historical Research, Immigration, Legislation, Publicity, Canadian Industries.

A very interesting feature of this convention was exhibits of articles made by Girls' Garment-Making Clubs; hats made by the wearer within the past year; a collection of baking—two loaves of bread, six or more buns, twelve cookies, twelve tarts, twelve doughnuts; (each branch in the district was allowed to exhibit only one collection of baking); house dresses made by those who had taken a sewing course in a Women's Institute class; first-aid kits which had been in use since the first of April, 1926; school lunches (one exhibit allowed from each branch); Institute programmes.

The businesslike manner in which the convention was organized and carried on reflects great credit on the capabilities of the women in the subdivision concerned.

While special mention is made of the Belleville Convention, largely because of the splendid exhibits they had in connection with their convention, we are pleased to state that the convention committees in all other areas co-operated effectively in making plans and carrying them through for their respective areas.

Educational Programme at Canadian National Exhibition

Ontario co-operated with the other provinces in making exhibits and presenting educational programmes at the Canadian National Exhibition under the auspices of the Federated Women's Institutes of Canada. The programme for Ontario included a Pageant representative of the pioneers and their customs; demonstration of carpentry by boys who had taken a special course in manual training organized under the auspices of the Women's Institutes. These boys made a swing, a teeter, and a sand box as playground equipment; competition by members of the Junior Women's Institutes in cookery, when the contestants were required to prepare and serve afternoon refreshments for twenty people. There was a competition also in posters, representative of the activities of the Women's Institute. Demonstrations in sewing, when instruction was given in such simple things as set-in sleeves, patch work, bound button-holes, etc. Prizes were given for the best child's dress suitable for wearing to school. In addition to this a number of addresses were given of special interest to women. Mrs. H. M. Aitken, of Beeton, general superintendent of the Dominion-wide exhibits, gave demonstrations covering a variety of cookery of special interest to rural women.

The effectiveness of the Women's Institute work in general is due in no small measure to the hearty co-operation of the Department and the Institutes in making the common property of all, up-to-date information as to what the Institutes in general are doing. It is possible through the Institutes to arrange, with very little effort on the part of the Department, for meetings to be addressed by lecturers sent out by the Department, and instructors to conduct demonstration-lecture courses in which systematic instruction is given for a period of two weeks or more in the one centre. One of the much appreciated services of the Department is to bring to the attention of the Institutes, literature bearing upon problems in which the women are specially interested, and to furnish the officers with sample copies of publications which are for free distribution, the individual members writing to the Department or organization concerned for additional copies.

FRUIT BRANCH

In certain sections of the Province during the past year, work with the apple growers was carried out with some difficulty. The severe frost of October, 1925, destroyed a heavy percentage of the Spy and other late picking varieties, and caused a state of uncertainty in all our markets as to keeping conditions of our fruit, so much so that prices were unusually low. As the Spy crop was very large and of good quality the loss was heavy, particularly in the Georgian Bay and Lake Ontario sections, where picking was not so far advanced. Growers in these sections were so discouraged that the Spray Service of the Department was not received with the same enthusiasm as in past years.

In other sections, however, including Prince Edward, Huron and Norfolk, good work was done, and in addition, the Counties of Lambton, Middlesex, Brant and Halton were included in the area under supervision. Despite a most unfavourable season, with constant showers from the middle of July on until the end of October, the sprayed orchards were clean and the fruit of very fair colour. Where Bordeaux was used for the first two sprays considerable russeting of the fruit resulted in Western Ontario, lowering the grades to domestic in many cases.

The work in Prince Edward County has been particularly successful and the growers are very appreciative of the services as the following extracts from letters will show:

"Looking over my records of different years' fruit crops, I find that in 1923 I had the same number of barrels as this year, viz., 273. The gradings were as follows:

	1923	1926
No. 1	118	176
2	61	59
3	94	18
Domestic	...	20

I am sure I had many fewer culls this year than in 1923.

"I attribute the evident improvement in our apple crop to the Spraying Service, to helpful hints on trimming and better orchard practice as taught by the Department's representatives and which we have endeavoured to follow."

"I felt you would be interested to have some idea of the results of the spray service as it had affected me this year. And since packing, I am able to report at least 95 per cent. of our apples entirely free from scab and fungus, so that our culling consisted almost entirely of under-size apples.

"This, I am sure, is most pleasing to me and I felt you would appreciate knowing just to what extent results had been obtained. I sincerely trust that the Department will see fit to give us the benefit of your advice again for another season."

The tender fruit belt throughout the Niagara Peninsula had its trials this year also, with the very peculiar season. The western section had a heavy plum and grape crop but was very short on peaches. Anxiety was general as to the probability of the grapes ripening before severe frosts came, but fortunately the entire crop, estimated at 36,000,000 lbs., was harvested. Of this quantity, it is figured that 20,000,000 lbs. were used by the wineries.

Prices on plums were low and part of the crop was not harvested. Too many varieties, some of them of poor quality, have been planted, while of the good varieties, our Canadian markets are now apparently overloaded.

As a result of reports made to the Department by representative fruit growers sent by the Government to Great Britain last year, it was decided to try out some experimental shipments to London, Glasgow and Liverpool of our Ontario plums. With the coming into bearing of increased quantities of Damsons, Reine Claudes, Grand Dukes and other good varieties, prices on our local markets have declined seriously and unless some other outlet could be found, heavy losses were inevitable. Guarantees were given on four cars shipped from Grimsby and Burlington to London, Liverpool and Glasgow, and in addition, several cars were shipped from these points on the shipper's own account.

Glasgow proved very disappointing as a market for this fruit despite assurances received from the trade there that it was the best point. London gave by far the best returns, though Liverpool looks like a good market also. It is possible that a direct trade with Glasgow could be profitably arranged for disposing of Damsons, as the big jam manufacturers are located in the north, but this trade would be for large quantities laid down there in bulk at as low a figure as possible, probably not to exceed $100 per ton.

As to the results obtained from the shipments, we are quite safe in saying that this market looks very promising for our later plums. Prices are usually very low until the beginning of October, and the returns would not justify putting the expense into packages, freight, etc., that is required. The initial outlay is so heavy that it will deter the ordinary grower from attempting shipments, and the business will remain in the hands of associations or companies who are prepared to risk the heavy expense of labour, paper, packages, pre-cooling, prepaid freight, etc. As it is a carload business and great care has to be exercised in grading and wrapping the fruit, central packing houses are necessary, and only those so equipped should attempt the exporting of this fruit.

In addition, direct representation in the markets there seems essential. The presence in Liverpool of an agent of the Ontario Fruit Growers' Association undoubtedly saved the shippers from considerable losses on the later shipments. Two cars reached the British markets in advance of his arrival, and it was on these that losses were incurred, due in part to misleading information obtained from receiving houses in Great Britain. The later cars, personally looked after, gave much better returns.

The export situation covering all fruits has been so unsatisfactory that this Department called a conference of shippers during the summer, at which the special Fruit Trade Commissioner of the Federal Government advocated the placing in Great Britain of a man to represent the growers and shippers. His duties were not so much to make direct sales of the fruit as to work with the trade there so that every shipment would reach the best market and be sold to the greatest advantage. As a result of this conference, the Ontario Fruit Growers' Association sent over a special representative who was well acquainted with conditions in Great Britain and to whom shippers were invited to consign cars of fruit intended for these markets.

The very light crop of apples and pears, and the low prices ruling in the export markets, prevented any great quantities being handled in this way the past season. Sufficient, however, was received to gain very valuable information and to establish connections for future business. Mention has

already been made of the valuable services of this agent in handling the plum shipments.

With the changing conditions in Ontario apple orcharding, and increasing competition from all parts of the continent, every effort will be required on the part of both growers and the Department to hold and extend our markets. The brightest spot in the outlook is the coming into bearing of the orchards set out from ten to twenty years ago, at a time when experience had proven the value of many new and old varieties.

The orchardists in the Georgian Bay section fortunately continued the planting of Northern Spy as their leading variety, and many thousands of trees are now bearing their first crops. In the Norfolk section, Spy was also planted freely, but equally with Baldwin and Fameuse, with Scarlet Pippin, McIntosh and Greening also favoured. Fameuse and McIntosh were generally favoured for dessert kinds and increasing quantities will be available not only from the districts already mentioned but also from the St. Lawrence and Ottawa Valleys where these two varieties succeed exceptionally well.

Unfortunately during the period of heavy planting, that section of the Province, east of Toronto to Belleville, was interested largely in the British and continental markets, which then required large quantities of hard winter apples, such as the Ben Davis, Cranberry, Gano, Stark, Pewaukee and Baxter. With improved methods of packing and transportation and increasing competition from sections of the continent producing better varieties, the demand and consequent prices for the above kinds has fallen so low that in most years costs of picking, packing and marketing cannot be obtained. Those growers that have orchards largely of Ben Davis have a difficult situation to face, and unless the fruit can be used economically for some other purpose than the fresh fruit trade, there will be no other plan than the destruction of the trees with replanting of better varieties.

HORTICULTURAL EXPERIMENT STATION

With the exception of the peach crop, fruit crops throughout the Niagara District were fair to good in 1926. In the station orchards the practical failure of peaches interfered to a very considerable extent with the plant breeding and experimental work with that fruit.

The comparatively light peach crop in the Niagara District was due mainly to killing of the fruit buds by low temperatures during the latter part of December, 1925. Following this cold spell the station undertook a comprehensive survey of the peach belt to determine the extent of the injury. This survey indicated most severe injury in the western end of the district around Winona and Grimsby, with gradually lessening injury eastward until, in the "River" area, around Queenston, Niagara-on-the-Lake, etc., there was no appreciable damage. The amount of injury at any given point was roughly in proportion to the severity of temperature ten degrees Fahrenheit being the approximate temperature around Queenston with gradually lower temperatures westward, reaching fifteen degrees Fahrenheit at Vineland and sixteen degrees to eighteen degrees Fahrenheit in the extreme western peach area.

At the time of the above survey, the probable total peach crop, including the favoured "River" area, was placed at about forty per cent. of normal. This estimate was borne out by the crop actually harvested, though intervening estimates by various individuals usually placed the probable crop at considerably above the forty per cent.

The part-time appointment of a plant pathologist to the Station staff has made possible the planning of new lines of breeding and experimental work. Particularly will it simplify the breeding projects having disease resistance as the main objective. It is planned also to undertake, in co-operation with the Dominion Entomological Laboratory at Vineland, a study of the physiological effects of various spray materials on the rest period in fruit trees. All of the above is in addition to regular plant pathology studies already under way or being planned.

The following bulletins were revised and reprinted during 1926: No. 315, Plum Culture in Ontario; No. 316, The Cherry in Ontario; No. 318, Currants and Gooseberries. Bulletin No. 319, Nursery Stock Identification, was prepared and published. In addition to the above, revisions have been completed of Bulletins No. 194, Apple Orcharding, and No. 294, Grafting Fruit Trees. In No. 315, Plum Culture in Ontario, considerable Station experimental results in pollination and fruit thinning were included in addition to the usual cultural directions. No. 319, Nursery Stock Identification, represents original work in its entirety.

PLANT BREEDING

Distribution of Plant Material—The 1926 spring and fall distributions of Viking raspberry canes practically completed the distribution of this variety in so far as this Station is concerned, as stock is now available from several growers and nurseries. The total distribution to date has been as follows:—

1921	2 dozen
1922	1 "
1923	None
1924	2,000
1925	40,000
1926	40,000

Allowing for a considerable mortality in the above, but including natural increase by growers and nurserymen from the earlier distributions, it is conservatively estimated that there are about fifty acres of Viking planted. These plantings are mostly in the Niagara District. The only limit to planting in the past three years has been the supply of plants. With prospects for a good supply of these there will undoubtedly be increasingly heavy plantings.

Canning tests of Viking made by the Culverhouse Canning Co. of Vineland, indicated the variety to be good in this respect. The canned fruit is whole, firm, of good quality and good colour, though lacking the deep colour of Cuthbert. In weight of solids per can it is equal to Cuthbert or better.

The Vanguard strawberry and the Vedette and Valiant peaches are being handled commercially by a number of nurseries so that no accurate estimate of distribution or acreage can be made. Nurserymen report a heavy demand for stock of Vedette and Valiant, being mostly sold out on these varieties for 1927 delivery before the close of 1926.

Strawberry Breeding—The earlier strawberry breeding work has produced several seedlings worthy of further trial, chief among them being the variety named Vanguard. In 1925, a considerable amount of new work was undertaken, the main purposes of this new work being the production of new varieties possessing some of the quality of the old country varieties while retaining the hardiness

and climatic adaptability generally of our present commercial varieties; also, new varieties of high canning qualities such as Portia, but perfect in bloom. The following table summarizes this work. The number of plants noted has been set in the field where they will fruit in 1927:—

1925 STRAWBERRY BREEDING WORK

Parents	No. of Plants
Vanguard x Royal Sovereign	22
Crescent x Vanguard	51
Crescent x Early Ozark	115
Crescent x Royal Sovereign	95
Crescent x Seedling No. 180115	555
Crescent x Dunlap	385
Crescent x Aroma	233
Ozark x Royal Sovereign	249
Ozark x Seedling No. 180115	372
Ozark x Dunlap	85
Aroma x Royal Sovereign	62
Aroma x Dunlap	91
Aroma x Seedling No. 180115	95
Seedling No. 180115 x Ozark	214
Seedling No. 180115 x Excelsior	141
Excelsior x Royal Sovereign	79
Excelsior x Dunlap	441
Excelsior x Seedling No. 180115	374
Dunlap x Aroma	80
Dunlap x Ozark	315
Dunlap x Excelsior	190
Dunlap x Seedling No. 180115	285
Dunlap x Royal Sovereign	40
Royal Sovereign x Ozark	30
Royal Sovereign x Excelsior	18
Royal Sovereign x Dunlap	45
Royal Sovereign x Seedling No. 180115	22
Portia x Royal Sovereign	82
Portia x Parsons	12
Portia x Ozark	281
Portia x Dunlap	71
Portia x Aroma	96
Portia x Excelsior	104

Raspberry Breeding—Including the breeding work of 1923, the main objective of the raspberry breeding has been to secure new varieties resistant, in part at least, to the disease known as *mosaic*. Breeding seems to offer the only permanent and satisfactory solution of this very serious problem.

Fortunately there are already several varieties of raspberries, which, although falling somewhat short as commercial varieties, yet apparently possess considerable or total resistance to mosaic. Among these may be named Erskine Park, St. Regis and Adams No. 87. In 1923, the following crosses were made, the first named variety being the seed parent in each cross:—

Cross	No. Plants Secured
Cuthbert x Erskine Park	76
Erskine Park x Cuthbert	234
Cuthbert x St. Regis	321
St. Regis x Cuthbert	324
Viking x Erskine Park	98
Erskine Park x Viking	285
Viking x St. Regis	1,029
St. Regis x Viking	321
Total	2,688

Approximately three-fourths of these plants fruited in 1926. Some sixty selections were made as being worthy of further test. These will have to be propagated in a limited way and then their resistance to mosaic determined. It is worth while noting in this connection, that Viking is being used in Michigan quite extensively in mosaic studies. Results there would indicate at least some measure of resistance to mosaic, greater than that of either parent variety, Cuthbert and Marlboro.

In 1925, further raspberry crosses having disease resistance in mind, were made as follows:—

Cross	No. Plants Resulting
Viking x Adams No. 87	130
Viking x Adams No. 34	50
Viking x Adams No. 101	500
Adams No. 87 x Viking	1,400
Adams No. 34 x Viking	1,600
Adams No. 101 x Viking	2,400
Total	6,080

About fifty per cent. of these have been set in the field. The remainder will be planted out in the spring of 1927. They should fruit freely in 1928 and 1929.

Peach Breeding—Owing to the practical failure of the peach crop in the Station orchards, no new breeding work was undertaken in 1926. However, the cold wave of December, 1925, which caused the injury to the buds, performed at least one useful purpose from a plant breeding standpoint. It indicated quite clearly the relative bud and wood hardiness of various varieties and Station seedlings. As a result certain selections, lacking hardiness, were discarded. Certain other selections, as compared with present commercial varieties, showed satisfactory hardiness. Vedette and Valiant both carried through a higher percentage of live buds than comparable trees of Elberta. The same was true of Seedling No. 1940208, an Elberta type peach maturing about a week in advance of Elberta, and considered very promising.

Apple Breeding—Breeding work with apples is necessarily slow, as compared with small fruits or with peaches. Nevertheless seedling trees from projects started in 1917 are now commencing to bear. In 1926, there was scattered fruiting. Including projects of later years, there are now growing in permanent fruiting blocks some 3,300 seedlings representing the progeny of fifty standard varieties, and a further 180 trees which are seedlings of eight distinct apple species.

Other Fruits—In pears, plums, cherries and grapes a considerable amount of new work has been undertaken. This is in addition to carrying on older work which consists largely of discarding inferior seedlings and selecting and propagating for further tests those which appear to have merit. A number of promising selections have been made in pears, sweet cherries and grapes, but, with the exception of the Victor Cherry, they will be kept under observation for some time yet before naming or introducing any of them.

Vegetable Breeding—The tomato selections mentioned in the 1925 Report gave good early yields in 1926, especially the Bonny Best Prosperity cross. This strain is being re-selected in order to secure one as true as possible to the characters desired.

Some additional selections from the Grand Rapids x Earliana and the Bonny Best (818) x Earliana hybrids are considered very well adapted to forcing or for early outdoor staking. The fruit of these selections is medium in size, round, smooth and uniform, early, and the plants are productive.

EXPERIMENTAL WORK

Orchard Cultural Methods—In 1921 an orchard consisting of four and one-half acres of apples and one and one-half acres of pears was planted with the object of giving further study to the sod-mulch methods of orchard culture. It is recognized, of course, that under most conditions sod *neglect* seriously reduces tree growth and yield. The experiment as planned provides for sod *culture*, with all that the name implies. Various plots have been seeded to alfalfa, red clover and grass, others have been kept clean with the intention of seeding down when the trees are well established. Still others will be kept clean continuously. All plots are to receive barnyard manure and commercial fertilizers as their need is indicated by the growth of the trees. Cut material is not removed but is mulched around the trees.

The experiment has now been under way for five years. Annual growth measurements have been taken. While no significant differences are apparent, this in itself is significant, since it means that the sod-mulch plots are doing very well in comparison with the clean culture plots. On an average the clean cultivated trees have made approximately twenty per cent. more growth than the sod trees. On the other hand, the sod trees have made excellent growth, the foliage is of good colour, and they have been the first to start bearing.

Nursery Stock Identification—The leaf and other plant character identification studies were sufficiently completed in 1926 to permit of the publication of Bulletin 319, Nursery Stock Identification. This bulletin deals with pears, plums, peaches and cherries.

The field work made possible by these studies is summarized for 1926 in the following two tables. Table 1 gives the numbers of saleable fruit trees (2-year apples, pears, plums and cherries, and 1-year peaches) inspected in 1926. One-year cherries, also inspected, are not included in the count.

TABLE 1—SUMMARY OF NURSERY INSPECTION, 1926

Nursery	Apples	Pears	Plums	Cherries	Peaches	Total
1	10,000	500	......	3,000	15,000	28,500
2	2,500	2,000	350	1,200	2,700	8,750
3	2,000	800	800	500	......	4,100
4	2,000	......	......	......	......	2,000
5	12,000	5,000	3,000	1,800	......	21,800
6	23,000	1,000	2,500	1,300	1,800	29,600
7	25,000	4,000	7,800	3,000	......	39,800
8	......	......	......	......	2,000	2,000
9	60,000	15,000	15,000	5,600	60,000	155,600
10	210,000	28,000	30,000	35,000	13,000	316,000
11	200	......	100	40	300	640
12	20,000	8,000	5,000	4,000	......	37,000
13	......	......	......	......	3,000	3,000
14	6,700	1,900	1,900	60	......	10,560
Total	373,400	66,200	66,450	55,500	97,800	659,350

Table 2 summarizes the mixtures found in the various nurseries. With the exception of cherries, the percentage of mixture is very low indeed. In cherries the high percentage is due to the fact that Black Eagle and Yellow Spanish have been confused with, and propagated for, Black Tartarian and Napoleon respectively. These errors constitute seventy per cent. of the cherry mixtures.

TABLE 2—NUMBERS OF MIXTURES FOUND IN ONTARIO NURSERIES IN 1926

Nursery	Apples	Pears	Plums	Cherries	Peaches	Total
No. 1	30	....	....	425	55	510
2	1,055	11	....	640	166	1,872
3	0	0	0	700	....	700
4	10	....	....	.....	....	10
5	588	3	17	40	....	648
6	589	66	0	155	0	810
7	72	0	0	235	....	307
8	.....	....	....	.....	58	58
9	1,532	34	7	.....	326	1,899
10	931	0	0	2,940	....	3,871
11	.....	....	....	10	50	60
12	347	0	94	736	....	1,177
13	.....	....	....	.....	0	0
14	23	0	454	0	....	477
Total	5,177	114	572	5,881	655	12,399
Per cent. Mixtures	*1.4%*	*.2%*	*.9%*	*16.0%*	*.7%*	*1.9%*

Root Stock Investigation—The work of the East Malling Research Station in England, with fruit stocks, has directed the attention of horticulturists everywhere to the importance of clonal root stocks, which will give trees of practically identical vigour and growth habits. Much of the variability of fruit trees as now grown is due to differences in root stocks, these being seedlings rather than clones. Accordingly a considerable quantity of the East Malling stocks was secured in 1926, and a further quantity will be secured in 1927. This line of work offers tremendous possibilities both for the fruit grower and the nurseryman. Further studies, using native root stocks, will be undertaken, funds permitting.

Vegetable Experiments—In tomatoes comparative test plots of twenty different commercial Earliana strains and other early varieties were made in 1926, the object being to see if any strains possessed the outstanding merit claimed for them. Yields per plant were taken up to August 20th, which includes the period of highest prices. Considerable variation was noticed as to yield as well as type and vigour of plants. The outstanding varieties were Red River, which produced the most early fruits, two strains of Canadian, and an Earliana from Michigan State College. The Red River is a cross of Earliana and Sunrise, and originated in North Dakota by A. F. Yeager. It is a medium sized red fruit, smooth and fairly uniform. The Canadian originated at the Horticultural Department of the Ontario Agricultural College. It is also a hybrid but shows some variation. Of five different sources of Canadian seed two lots were near enough to be classed as the same variety. The Earliana from Michigan is an improved type being fairly uniform, early and smooth.

In addition to the continuation of breeding and selection with other vegetables as reported in 1925, a cultural test on the best methods of establishing a patch of onions was carried out. Three methods were used as follows: First, the use of transplanted seedlings; second, the use of sets; and third, the use of seed sown in the open ground. The sets started into growth earlier and produced larger bulbs which ripened off much earlier than either of the other plots. The yield was much better also. The transplants did quite well and for one variety did better than the sets. However, the sets on the average gave the best returns. The seed plot was quite late in getting started and also suffered considerably from maggot injury.

Onions.—Yields for the three methods:

Sets	bushels per acre	623
Transplanted	" "	465
Seed	" "	169

While the first two methods may be limited as to the area which can be handled at planting time yet there is a wide margin of yield over the open seeding suggesting the advisability of planting at least part of the acreage by one or other of the first two methods.

A fertilizer plot test on late celery indicated that nitrogen in available form was of first importance and potash second, while phosphorus did not produce any appreciable increase in growth or yield on Station soil. The nitrogen-potash plot was outstanding during the whole season. This applies only to one particular soil but is at least an indication for other soil types as well.

EXTENSION

During 1926, 607 visits to individual growers were made by the Extension Specialist. In addition, a large number of unrecorded visits were made by other members of the staff. Nor was any record kept of visits of growers to the Station. These, however, were numerous as in other years, as were also telephone calls for cultural information.

Throughout the Niagara District and elsewhere in the Province also considerable interest is evident in top-working undesirable varieties and unproductive trees. Many grafting demonstrations were held. These included one in Whitby, four in Norfolk, one in London and sixteen in the Niagara District. These latter were mostly with sweet cherries, and were so planned as to give individual instruction to relatively small groups of growers.

Many requests for addresses on various horticultural topics were filled. In addition, Fruit Growers' Meetings in Hamilton, Cobourg, Meaford, Simcoe, Goderich and St. Catharines were attended by various members of the staff and addresses given. Lectures on fruit and vegetable growing were given at each of the following Short Courses: Orono (Durham Co.), Flesherton (Grey), Acton (Halton), Melbourne (Middlesex), Sunderland (Ontario), Dresden (Kent).

Fruits and vegetables were judged at the following school and fall fairs: Grantham, Burlington, Welland, Smithville, Abingdon, Milton, Beamsville, Vineland, St. Catharines. Fruit was judged at the C.N.E., Toronto, and the Western Fair, London.

Extension experiments in budding and grafting the plum and sweet cherry were carried on in twelve different orchards in the Niagara District.

DAIRY BRANCH

The year 1926 may be considered as only a fairly satisfactory one for the dairymen of the Province.

The prices for cheese and butter were not as high as in 1925. The average price for cheese being about 17 cents, against 20½ cents in 1925; and for butter about 33½ cents in 1926, against 37 cents in 1925.

The instructor's reports show a considerable increase in the quantity of cheese made in 1926, as compared with the same periods in 1925. The quantity of creamery butter made can only be estimated as it was not possible to get reports from all the creameries in 1926.

Ten cheese factories were burned down and fourteen new ones erected in 1926. Thirteen new creameries commenced operation during the year.

Instruction and inspection work was carried on by a staff of thirty-five cheese instructors, nine creamery instructors, four milk and cream check tests, and three chief instructors. The grading of butter was again carried on at the Government Grading Station, Toronto, on similar lines to 1925; the chief instructor for creameries and two assistants doing the work.

PLANTS IN OPERATION IN 1925 AND 1926

	Cheese Factories		Creameries		Condensed Milk and Powder Plants
	1925	1926	1925	1926	1926
Northern Ontario	11	14	16	24	...
Eastern Ontario	681	684	74	77	7
Western Ontario	93	96	175	177	19
	785	794	265	278	26

QUANTITY OF CHEESE, 1926

Northern and Eastern Ontario, May 1st to October 31st	91,857,428 lbs.
*Western Ontario, January 1st to December 31st	23,221,376 "
Total	115,078,804 "
Total for same period in 1925	109,500,000 "
Increase in 1926	5,578,804 "

*December estimated.

VALUE OF CHEESE

1925	$21,920,000
1926	19,563,396
Decrease in 1926	$2,356,604

QUALITY OF CHEESE AND BUTTER AS SHOWN BY THE FEDERAL GRADER'S REPORTS

Cheese	Special and First	Second	Third
Ontario, 1926	92.6%	6.8%	0.6%
Ontario, 1925	91.4%	7.9%	0.7%
Increase in 1926	1.2%		

Cheese by Districts, 1926	Special and First	Second	Third
Northern Ontario	93.9%	6.0%	0.1%
Central Ontario	93.7%	5.7%	0.6%
Western Ontario	93.4%	6.4%	0.2%
Eastern Ontario	91.9%	7.4%	0.7%

Cheese by Provinces, 1926	Special and First	Second	Third
Prince Edward Island	88.8%	10.7%	0.5%
Nova Scotia	......	......	.....
New Brunswick	6.4%	70.6%	23.0%
Quebec	77.8%	21.2%	1.0%
Ontario	92.6%	6.8%	0.6%
Manitoba	76.0%	21.8%	2.2%

It will no doubt become more difficult to increase the percentage of first and special grade cheese year by year, yet there is no good reason why we should not have at least ninety-five per cent. first grade. Better trained makers and a pure milk supply is all that is needed. We are looking forward to a decided improvement in both respects from the granting of graded certificates to makers in 1927.

The production of creamery butter is estimated to be about the same as in 1925—59,000,000 pounds.

The following figures regarding the quality of the creamery butter are taken from the Federal Grader's Report:

Creamery Butter	First	Second	Third
Ontario, pasteurized, 1926	81.7%	17.5%	0.8%
" " 1925	69.7%	25.2%	5.1%
Increase in 1926	12.0%		
Ontario, unpasteurized, 1926	40.5%	41.1%	18.4%
" " 1925	28.5%	69.1%	2.4%
Increase in 1926	12.0%		

Pasteurized Butter by Provinces, 1926	Specials	First
Quebec	1.1%	88.7%
Ontario	......	81.7%
Manitoba	0.3%	66.4%
Saskatchewan	0.1%	51.2%
Alberta	14.9%	62.3%

CREAM GRADING

Regulations governing the grading of cream and paying for it on a graded basis were brought into force on May 1st, 1926. The creamerymen were practically unanimously in favour of the legislation and supported the movement very well indeed.

The standards for cream, and the differences in price are as follows:

Special Grade.

This grade shall include any lot of cream which is clean in flavour, of uniform consistency and suitable for making butter of this grade. Its acidity shall not be more than thirty-one-hundredths (.30%) of one per cent. at the time of being graded at the creamery where it is to be made into butter, and the fat content shall not be less than twenty-eight per cent.

First Grade.

This grade shall include any lot of cream which is reasonably clean in flavour, of uniform consistency and suitable for making butter of this grade. Its acidity shall not be more than sixty-one-hundredths (.60%) of one per cent. at the time of being graded at the creamery where it is to be made into butter.

Second Grade.

This grade shall include cream that does not meet the requirements specified for first grade cream; such as cream that is bitter, stale, musty, metallic or otherwise unclean in flavour, or has an acidity of over sixty-one-hundredths (.60%) of one per cent.

Off Grade.

This grade shall include any cream with a strong objectionable odour or flavour, such as gasoline, leeks, stable, or such other flavours that may render cream unfit for making second grade butter.

Spread in Price.

A premium of (1) one cent per pound butter fat shall be paid for special grade cream over first grade cream, and a premium of (3) three cents per pound butter-fat shall be paid for first grade cream over second grade cream.

The grading was supervised as closely as possible by a staff of nine instructors, each instructor being in charge of from twenty-five to thirty creameries. The grading was done by employees of the creameries. The results of the work for the first season are quite satisfactory as shown by the Federal Grader's Report given above, and also by a comparison of the cream graded personally by the instructors in 1925 before cream grading was adopted, and in 1926, after the regulations were in force. The following information is taken from the Instructors' Reports.

Cream graded by the instructors during the six weeks beginning July 15th:

	Special and First Grade Cream	
Six weeks in 1925	57.2%	
" " " 1926	72.6%	Increase...15.4%
Lowest average for one week, 1925	51.5%	
" " " " 1926	68.7%	Increase...17.2%

Cream graded by the instructors at the creameries from May to October, inclusive, 1926:

May	Special and First Grade	66.8%
June	" " "	76.3%
July	" " "	73.8%
August	" " "	78.8%
September	" " "	80.6%
October	" " "	84.6%

These figures show a steady increase in the quantity of special and first grade cream received at the creameries, which indicates that the cream producers appreciate having their cream paid for on a quality basis, or in other words, work well done is being recognized and paid for accordingly.

BUTTER GRADING STATION

One hundred and thirty-eight creameries sent samples from 23,237 churnings to the Provincial Government Grading Station at Toronto, an increase of nearly thirty per cent. over 1925. These samples graded as follows: 1.7 per cent. special grade; 71.72 per cent. first grade; 26 per cent. second grade; and .58 per cent. off grade—an increase of 12.55 per cent. first and special grade over 1925. The value of grading samples from every churning is being recognized more fully each year; and especially since the grading of cream came into effect.

The improvements made in the sanitary conditions in and around the cheese factories and creameries is very gratifying—true, there is very great room for further improvement, especially at the cheese factories, but the beauty spots which have been made by making lawns, and planting flowers and shrubs around so many of the factories cannot help but have a splendid effect upon those who have not yet got into the spirit of making Ontario dairying not only profitable but an attractive and pleasant feature of the Province's agricultural life.

COW TESTING

The Provincial Department took over the cow testing work in the Province from the Federal Department on February 1st. The organization work is under the supervision of the Director of Agricultural Representatives, the testing of the samples under the Dairy Branch, and the improvement of the herds under the Director of Live Stock. A charge of fifty cents per cow per season is collected by the Dairy Branch, when special samples are tested, a charge of twenty-five cents per test is made. Blank forms for recording the weights, and tests of the milk, bottle labels and preservative tablets are provided by the above branches. A special testing station is established in the Municipal Abattoir, Toronto. All other testing is done at the offices of the District Representatives or at cheese factories and creameries. Two men are employed exclusively in testing samples in the Toronto, Hamilton and Simcoe districts. The balance of the testing is done by the regular staff of creamery and cheese factory inspectors.

The testing of composite samples at cheese factories is also done by the regular staff of instructors, a charge of fifty cents per patron being made. The revenue for the fiscal year 1925-26, from cow testing and composite sample testing at the factories was $13,992.89.

EASTERN DAIRY SCHOOL, KINGSTON

The attendance at the School, January 1st to March 31st, was as follows:

Regular Long Course	43
Special Cheesemaker's Course	62
" Buttermaker's Course	30
Instructor's Course	31
	166

Thirty-two wrote on the final examination of which twenty-eight were successful. During the balance of the year the School is operated as a combined creamery and cheese factory. The following figures are taken from the Superintendent's report for the fiscal year November 1st, 1925, to October 31st, 1926:

Butter manufactured	153,224	lbs.
Cheese manufactured	98,259	"
Average per cent. fat in the milk	3.35	
Pounds milk per pound cheese	10.96	
Pounds cheese per pound fat	2.72	

CO-OPERATION AND MARKETS BRANCH

A grand total of 276 co-operative oganizations have been incorporated in the Province under The Ontario Companies Act, and most of these have to do with one phase or another of agriculture, practically the only exceptions being the few retail or distributive co-operative stores in some of the towns and cities. The following is an incomplete list of the objects stated by these Agricultural Co-operatives in applying for incorporation:

Marketing Apples,
Manufacture and Sale of Butter,
Marketing Fluid Milk,
Cheese Factory,
Marketing Cheese,
Marketing Early Vegetables,
Marketing Potatoes,
Marketing Seed Potatoes,
Potato Warehouse,
Sale of Pure Bred Animals,
Live Stock Shipping,
Marketing Live Stock,
Weigh Scales,
Beef Rings,
Threshing Ring,
Cold Storage,
Egg Marketing,
Chicken Hatchery and Day-old Chicks,
Marketing Seed,
Marketing Seed Corn,
Elevator,
Seed Cleaning Plant,
Feed Business,
Marketing Grain,
Onion Marketing,
Apple Packing House,
Milling Business,
Processing and Marketing Tobacco,
Marketing Beans,
Marketing Honey,
Marketing Celery,
Marketing Alfalfa Seed,
Marketing Turnips,
Marketing Turkeys,
General Marketing of a Number of Agricultural Products and Handling of Farmers' Supplies.

It is impossible to state the proportion of the total number of incorporations which are in active operation at the present time. Attempts have been made to obtain this and additional information in co-operation with the Statistical Branch at Ottawa but responses have not been sufficient upon which to base definite figures. There are a sufficient number of well-known organizations, however, to state that co-operative marketing is making steady and sound progress in the Province, and that this system of marketing farm products has proven itself as a permanent and feasible method of meeting changing marketing conditions as they arise. A considerable number of these co-operative firms have been in existence for ten years and longer and have met successfully the extremely difficult readjustment period of the last few years.

Of the large number of successful organizations, it is difficult to choose outstanding examples as illustrating what has been accomplished, but for the purpose of illustration, three different types might be cited.

(1) Canadian Wide Organization.

The commodity illustrating this type is wool. The Canadian Co-operative Wool Growers, Limited, covers Canada from the Atlantic to the Pacific and markets about one-third of the total Canadian clip. Sheep men to the number of 4,300 in the Province of Ontario use this agency in the marketing of their wool, totalling last year about 740,000 pounds. It is not too much to say that since this company was organized in 1917, the system of marketing Canadian wool has been entirely revolutionized, and perhaps the largest factor in bringing about the improvement in methods is the system of grading established by the co-operative and the payment to the producer on the basis of these grades. Concrete evidences of the benefits of grading may be cited as follows: (a) The increased use of Canadian wools by Canadian mills (perhaps 100 per cent. increase).

(b) Previous to four years ago no Canadian wool sold in England. Now the co-operative has its own direct connections in the export markets and last year sold a half million pounds in England.

(c) A new and profitable market has been opened up for Ontario coarse wools (Leicester, Cotswold, Lincoln) in the United States for the manufacture of a product known as paper felts.

The markets for wool generally are in a depressed condition, and it is easily conceivable that if the old methods of marketing wool obtained under the present conditions, wool producers would indeed be in an unenviable position. Through their own marketing agency, however, producers are kept fully informed as to changing market conditions, and are able to place their product on the world's markets on a sound merchandising basis.

(2) *Province Wide Organization.*

The commodity which best illustrates this type is honey. Here again The Ontario Honey Producers Co-operative, Limited, initiated its work by establishing grades. One further step was taken, however, in giving a brand name to its highest grade, and the popularizing of the use of honey by extensive advertising of this brand. That this organization is truly representative of the honey industry in the Province is evidenced by the fact that its 1,000 or more members comprise nearly all the large producers and most of the small producers, and it is estimated, handles between 80 and 85 per cent. of the commercial crop of the Province.

The conditions surrounding the marketing of Ontario honey has entirely changed during the last few years. Through this organizations the beekeeper is informed as follows:

(1) Honey production in Canada has about quadrupled in the last six years.

(2) The Ontario Co-operative has double the quantity to handle over the previous year.

(3) The western Canadian markets are practically gone, and already Manitoba, instead of importing, has honey for sale.

(4) Export markets must be found for one-half the light honey, and practically all the dark honey.

Under the old system of merchandizing it was difficult enough to maintain markets at remunerative prices. In fact, when this co-operative was organized in 1923 there was 1,500,000 pounds unsold in the producers' hands from the previous crop. The task here, was the finding of new markets to take the place of the quickly disappearing western market, due to the great increase of honey production in the three western provinces. This was a task obviously incapable of solution by the individual beekeeper and equally difficult for the honey dealer with a narrow margin and uncertainty of grades and prices. Through group action, however, the producers spent last year some $20,000 in advertising in our local markets and doubled the consumption in these consuming centres. The export market was also developed, and besides the usual merchandising methods, an interest was acquired in a bottling plant near London. Standard grades, standard packages, uniform prices, are making Ontario honey known not only in England, but in Holland, Germany and other European markets. It is impossible to even outline the accomplishments of this type of co-operative in grappling with the many problems confronting the producers on a province-wide basis and under such radical changes taking place both in supply and demand, but it well illustrates the place which a co-operative should fill in marketing a commodity on a basis of quality for its members.

(3) Local Organizations.

When we come to the third type, that covering a small area, there are, of course, a large number from which to choose. The recent organization of the Turkey Growers on Manitoulin Island, however, is a convenient illustration of the beneficial results even over a limited area, where there are conditions of marketing which might be improved upon. Turkey growing on the Island has been, more or less, important for some years. A suitable climate, abundance of free range, and other conditions provide opportunity for a large production of turkeys. The market, however, must of necessity be a distant market, and practically the whole production must be shipped out of the Island. Previous to the formation of the marketing company, turkeys were sold "by the pound," that is, at the one price per pound irrespective of the size or conformation of the birds. As a result of this system with its lack of incentive toward proper breeding methods, there was a steady decline in the size and quality of turkeys on the Island, mature birds seven pounds or more under standard weights, being entirely too common. As a result of being brought into closer touch with the needs of their market a marked improvement has already taken place. The first all-turkey show held in Canada was recently held on the Island, as indicating the interest aroused in the improvement of breeding and market stock. This small organization has already shipped two cars for the Thanksgiving trade, and will have two cars for sale at Christmas. Through their organization reliable market outlets have been obtained, and reliable sources of market information obtained. There is a marked improvement in the average size of the birds, better prices have been obtained, and a steady lowering of mortality in the turkey chicks. The organization also is encouraging the production and marketing of breeding stock. Already inquiries are being received, and Manitoulin Island is being looked to as a source of well-bred turkeys. Inspection of male birds has been instituted. These and other developments show that *co-operative marketing under the right conditions has a beneficial effect on the* production and preparation for market of a commodity where previously the marketing methods were resulting in steady decline of the quality and consequently of the value.

Other Local Organizations.

The above is but one illustration of a recently organized local co-operative showing practical results in a short time. Local fruit marketing associations in the Province are, more or less, adequately serving the districts which they cover. Generally speaking the commercial producing districts in Western Ontario are farily well organized, but the commercial districts in Eastern Ontario are not so well covered with marketing organizations. Endeavours to co-ordinate the marketing of these local associations on a province-wide basis have so far not resulted in any definite action on the part of the producers, perhaps partly for the reason that the local co-operatives are doing good work in their respective territories. That the marketing of Ontario fruit is fairly well organized, however, is indicated by the fact that there are some thirty-six (36) local associations, some individual associations marketing in excess of $100,000 worth of fruit annually.

Numerous local organizations, both incorporated and unincorporated, are practising co-operative shipping of live stock; many of these individual clubs shipping in excess of $200,000 worth of live stock each year. Egg marketing

through local organizations known as egg circles is operated at some forty (40) points in the Province. In one instance, at least, a number of these local circles combine to candle, pack and sell eggs and also to operate a mammoth incubator, in order that the members may be supplied with high-yielding, blood-tested stock. During last spring this incubator hatched some 20,000 chickens for members of local egg circles. Some of these local organizations market poultry co-operatively. Just recently some five of these local clubs shipped a car of poultry each, totalling net to the producers over $10,000 for the five cars. In the dairy field there are a number of eminently successful co-operative creameries, cheese factories and fluid milk marketing companies. One large co-operative acts as a sales agent for a number of local factories, selling considerably in excess of $3,000,000 worth of cheese annually, as well as providing cold storage facilities for its patrons. Since the operation of the seed cleaning train in Eastern Ontario last year, a number of local seed cleaning plants have been established in that part of the Province. Co-operative alfalfa seed, clover seed and seed potato organizations are also in operation. There are some excellent examples of the improvement in grain crops as a result of the organization of local co-operative elevators. Many other local organizations might be cited, having to do with some phase of marketing turnips, celery, late potatoes, tobacco and other farm products. Many of the local organizations also carry on more than one line of work with regard to marketing and also handle farm supplies, such as feeds, fertilizers, spray materials, packages, etc. A large central co-operative, the United Farmers' Co-operative Company, Limited, supplies numerous services for local co-operatives both in marketing and supply departments. It acts as a commission firm on the stock yards, runs the largest creamery in the Province, has seed, grain, eggs and other departments in connection with the wholesale functions of marketing, and has a large wholesale department for all manner of farm supplies.

If statistics were available showing the total of co-operative business in the Province, and the growth of such business during the last few years, impressive and steadily progressive figures would be presented. Unfortunately such figures have not been procurable, but general observation reveals the fact that co-operative marketing is permeating all sections of the Province. Diversified agriculture, marked differences of climatic and soil conditions within the Province, large and important local markets, and other factors differentiate Ontario from the western provinces with regard to the formation of large and spectacular organizations and it would appear as the natural trend here that local co-operatives, generally speaking, should first meet the needs in the varying sections of the Province. As in the case of cheese, live stock and some other commodities, these locals will in time supply the basis for larger organizations.

It will be seen from the above that the work of this department is wide and varied in assisting the numerous co-operatives in their organization. Detail assistance and advice is given as to incorporating under The Ontario Companies Act, to suggesting by-laws for individual organizations, to form of membership contracts, to methods of financing, and numerous other details as to sound methods of organization. The department, of course, carries on no part of the business of any co-operative, but keeping in touch with marketing organizations, is in a position to make available to new organizations, the experience of the older and successful ones, and how to avoid some of the mistakes of those which have not succeeded. Much of the work consists of assisting co-operatives in the organization and initial stages of their business.

English Market Cable

On Thursday morning of each week during the year, the Agent-General for Ontario in London, England, forwards a cable giving a summary of market prices on live stock, cheese, bacon, butter and apples in season. Prices are also given on these commodities from other countries which compete with us on the London market. The cable arrives in time to be prepared for the noon mail on Thursdays and appears on the agricultural page of the Toronto morning papers on Fridays, and in the agricultural papers over the Province. The Agent-General also sends a monthly letter giving a general outline of the conditions as they affect the trade in the articles mentioned, and this also is given publicity through the agricultural press.

Community Halls

The Community Halls Act was passed in 1919 providing for grants toward the erection of community halls and athletic fields in rural municipalities. Under this Act grants have been paid to a total of sixty-four (64) such projects at the following places:

	Place	County
1920		
Binbrook Community Hall	Binbrook, Ont.	Wentworth
Cobden Community Hall	Cobden, Ont.	Renfrew
1921		
Lakefield Community Hall	Lakefield, Ont.	Peterborough
Blyth Community Hall	Blyth, Ont.	Huron
Raymond Community Hall	Raymond, Ont.	Muskoka
1922		
Humberstone Community Park	Humberstone, Ont.	Welland
South Norwich Community Hall	Otterville, Ont.	Oxford
Dunchurch Community Hall	Dunchurch, Ont.	Parry Sound
Londesboro Community Hall	Londesboro, Ont.	Huron
Moonstone Community Hall	Moonstone, Ont.	Simcoe
Kimberley Community Hall	Kimberley, Ont.	Grey
Slate River Community Hall	Slate River, Ont.	Thunder Bay
Eady Community Hall	Eady, Ont.	Simcoe
Vandorf Community Hall	Vandorf, Ont.	York
Currie's Crossing Community Hall	Currie's Crossing, Ont.	Oxford
Bancroft Community Hall	Bancroft, Ont.	Hastings
Caradoc Township Community Hall	Mount Brydges, Ont.	Middlesex
Mindemoya Community Hall	Mindemoya, Ont.	Manitoulin
Carlisle Community Hall	Carlisle, Ont.	Wentworth
Dorion Community Hall	Dorion, Ont.	Thunder Bay
Tottenham Community Athletic Field	Tottenham, Ont.	Simcoe
Glanford Community Hall	Mount Hope, Ont.	Wentworth
1923		
Percy Township Community Hall	Warkworth, Ont.	Northumberland
Tamworth Community Hall	Tamworth, Ont.	Addington
Humber Heights Community Hall	Near Weston, Ont.	York
Savard Community Hall	Charlton, Ont.	Timiskaming
Oxdrift Community Hall	Oxdrift, Ont.	Kenora
Waterdown Community Hall	Waterdown, Ont.	Wentworth
Stoney Creek Community Athletic Field	Stoney Creek	Wentworth
Dutton Community Hall	Dutton, Ont.	Elgin
Crathie Community Hall	Near Strathroy, Ont.	Middlesex
Grantham Township Community Hall	Near St. Catharines	Lincoln
Sharbot Lake Community Hall	Sharbot Lake	Frontenac
Cavan Community Hall	Cavan, Ont.	Durham
Heaslip Community Hall	Heaslip, Ont.	Timiskaming
Wellington Community Hall	Wellington, Ont.	Prince Edward
North Mountain Community Hall	North Mountain, Ont.	Dundas
Burriss Community Hall	Burriss, Ont.	Rainy River
Oakwood Community Hall	Oakwood, Ont.	Victoria

1924		
Ignace Community Hall	Ignace, Ont.	Kenora
Brooklin Community Athletic Field	Brooklin, Ont.	Ontario
Reaboro Community Hall	Reaboro, Ont.	Victoria
Roxboro Township Community Hall	Moose Creek, Ont.	Stormont
Crediton Community Athletic Field	Crediton, Ont.	Huron
Rosseau Community Hall	Rosseau, Ont.	Muskoka
Beamsville Community Hall	Beamsville, Ont.	Lincoln
1925		
Lynden Community Hall	Lynden, Ont.	Wentworth
Gooderham Community Hall	Gooderham, Ont.	Haliburton
Barwick Community Hall	Barwick, Ont.	Rainy River
Caledon East Community Hall	Caledon East, Ont.	Peel
Blake Township Community Hall	Near Fort William	Thunder Bay
McIntyre Community Hall	Near Port Arthur	Thunder Bay
Inwood Community Athletic Field	Inwood, Ont.	Lambton
Sunbury Community Hall	Sunbury, Ont.	Frontenac
Athens Community Hall	Athens, Ont.	Leeds
South Crosby Community Hall	Elgin, Ont.	Frontenac
1926		
Wainfleet Community Park	Wainfleet, Ont.	Welland
Claremont Community Park	Claremont, Ont.	Ontario
Sarnia Township Community Hall	Mandamin, Ont.	Lambton
Hekkla Community Hall	Hekkla, Ont.	Muskoka
Enterprise Community Hall	Enterprise, Ont.	Addington
Port Sydney Community Hall	Port Sydney, Ont.	Muskoka
Zephyr Community Hall	Zephyr, Ont.	Ontario
Bondhead Community Park	Bondhead, Ont.	Simcoe

The grants paid on this year's halls are as follows:

	Total Cost	Amount of Grant
Wainfleet Community Park	$6,000 00	$1,500 00
Claremont Community Park	4,428 25	1,107 12
Sarnia Township Community Hall	5,251 30	1,312 83
Hekkla Community Hall	1,836 75	459 19
Enterprise Community Hall	7,267 69	1,816 93
Port Sydney Community Hall	6,062 25	1,515 57
Zephyr Community Hall	6,411 02	1,602 76
Bondhead Community Park	3,803 71	950 93

In addition to the above, five more projects are about completed and an additional fifteen where some steps have been taken to erect community halls and athletic fields under the Act. It is not necessary here to emphasize the decided improvement in the social life of a district where suitable and attractive accommodations are provided. Two or more visits are made by this branch to each place where this community effort is undertaken. Under the Act the site, the plans and specifications, are approved by the department before construction, and the best assistance can be given by a knowledge of the local situation. In most cases also, the people are desirous of knowing, more than an Act and regulations can convey, the requirements of the department with regard to each particular project. In this way we have been able to maintain a rather high standard, and it can be safely said that where community halls have been erected under the Act, the people have a community building of which they are justly proud. In all cases we endeavour to assist the community to provide a plant somewhat better than they would otherwise have provided without the grant. In fact, in most of these communities there would be no community hall, but for the incentive supplied by the offer of assistance in this form. A second visit by the department is also necessary when the hall is completed for inspection, and if not entirely satisfactory, further visits are made till all details are completed and no grant is paid till the project is completed in conformity with the standard desired.

The total cost of all community halls and athletic fields erected under the Act since its inception is $582,239.34 and the total of grants paid thereon amount to $102,456.82 or 17.6 per cent. of the total.

COLONIZATION AND IMMIGRATION BRANCH

Some idea of the activities of the year in connection with colonization and immigration may be gained from the following figures:

Number of farm labourers placed	2,624
Number of domestics who passed through the Canadian Women's Hostel, 72 Carlton St.	2,674
Of this number, new arrivals totalled	1,340
Number of farm labourers placed by Salvation Army	25
Number of domestics " " "	673
Number of boys " " "	470
Number of boys received at Vimy Ridge Farm (five of these have not yet been placed)	174
Number of railway certificates issued to settlers proceeding to Northern Ontario (consisting of 494 adults and 69 children)	380

Of this number 90 per cent. were from the British Isles, the balance being from Denmark, Holland, Sweden and Switzerland, brought out mainly by the larger transportation companies. Immigrants from these countries, however, as a rule, make excellent settlers.

Vimy Ridge Farm

During the year an important step was taken in the launching of a plan for the settlement of boys from the British Isles on Ontario farms. In pursuance of an agreement entered into with the British Government and with the Dominion Government, arrangements were made to receive parties of boys from time to time throughout the year. A farm located about three miles from Guelph and known as the Vimy Ridge Farm, was taken over from the Settlers' Aid Commission to be used as the headquarters for receiving and distributing the boys arriving under this plan. The buildings were fixed up and enlarged so as to provide accommodation for as many as fifty boys at one time. The first party arrived in June but as the buildings at the farm were not ready at that time, this party was taken to the Ontario Agricultural College where systematic training was combined with a certain amount of practical work. Further groups arrived from time to time throughout the summer months and were looked after at the Vimy Ridge Farm. The boys remained at the farm for varying periods from a few days to a couple of weeks. They were then placed with farmers with whom they entered into an agreement of apprenticeship. The department, of course, keeps in touch with these boys and replaces any who have not been satisfactorily located the first time. It is sometimes necessary to place a boy two or three times before he gets a position for which he is best suited and in which he is most contented. The boys were around sixteen and seventeen years of age and for the most part they made good. In a few cases it has been necessary to send the boys back home, but over 90 per cent. appear to be well situated and likely to become good settlers. There is a demand on the part of the farmers of the Province for help of this nature and this plan will be developed into larger proportions in future years.

London Office

The office of the Agent-General for Ontario continues to render good service to the Province in Great Britain and Europe. In addition to the office at 163 Strand, London, a branch is maintained in Glasgow.

Conditions during the past year were materially affected by the general strike and the subsequent prolonged coal strike, which influenced all industry

and business in the British Islands. These conditions, however, tended to encourage emigration rather than otherwise.

The past year has been a better one than 1925 for general emigration business, and all our figures show an increase of business, and a larger number of selected settlers sent out to Ontario.

Our operations are, naturally, to a considerable extent governed by the emigration policy of the Government of Canada, and by the agreements entered into by that Government and the British Government, in connection with the Empire Settlement Act of 1922.

The past year has been notable, owing to the fact that it witnessed the cancellation of the old system of granting loans to farm workers and household workers, to assist them with their passages to Canada. The new system provides for reduced passages, in place of loans, and this year, under the new agreement entered into between the British Government and the Government of Canada, approved farm workers and household workers have been enabled to go to Ontario at a cost of £4.10 each. This is a very great improvement on the old system of loans, as it now means that the new settler commences his or her new life in Canada free of debt, with nothing to pay back to the Government.

The following example will show how the cost of these passages is apportioned. This case is that of a single farm labourer, who sailed from Belfast to Ontario, on March 27th, 1926.

	£ s. d.	£ s. d.
Total cost of transportation		22 7 11
Dominion Government's contribution	3 10 0	
Imperial Government's contribution	7 0 0	
Steamship Company's rebate	3 10 0	
Imperial Government's contribution against after-care	3 17 11	
Amount paid by passenger	4 10 0	
		22 7 11

The Government of Ontario was not directly a party to the agreement between the British Government and the Government of Canada, but the Agent-General for Ontario is authorized, under a subsidiary agreement, to nominate suitable emigrants for the above scheme, and in this way we secure all the advantages of the scheme for men and women put forward by us. This arrangement has worked very well.

There are always more married experienced workers with families available for emigration than there are of single experienced farm workers. The reason is that the married men are anxious to try a new country for the sake of the better opportunities for their children. The lack of extra house accommodation on many Ontario farms apparently limits the demand for help of this nature. However, ninety married couples with 221 dependents were sent out and on the whole they were splendid settlers. This work is greatly encouraged by reports which are received as to settlers previously sent out to Ontario. There was the case of a Scottish ploughman with thirteen children who went out from this organization in 1924. The father and the two eldest sons started work on the same farm the day after their arrival, while one of the daughters started work on the same day in the farmer's house. Four other girls were quickly placed as household workers and a year later they were still in the same positions doing well. The family had comfortably furnished their home, purchased a cow and pigs and paid back over $500 in connection with their passages to Ontario.

The past year witnessed the completion of negotiations which have been carried on for some years past for what is known as "The Boy Scheme." For the carrying out of this scheme an agreement was completed with the British Government and the Government of Canada. It provides for sending forward boys between the ages of fifteen and seventeen, to serve as farm apprentices. Free passages are granted under the provisions of the Empire Settlement Act. All boys approved must pay the cost of medical certificate and the cost of rail fare between home and port of embarkation. They must have a sufficient amount of clothing and a supply of funds for incidental expenses after their arrival. Every effort is made in selecting boys, to secure the right type and only a small proportion of those offering are accepted. For the first season a total of 160 were passed.

Another phase of boy settlement developed during the year in the Empire Fellowship Scheme. This arose out of the Wembley Exhibition following which a number of public-spirited citizens provided a fund out of which scholarships might be granted to a limited number of boys who desired to secure some agricultural education in the Overseas Dominions, with a view to settling on the land. The fund pays £30 per year to any boys approved. This is to pay the cost of the education. It is part of the scheme, however, that the boy shall work one part of the year on the farm and thereby earn money to supplement this amount. Arrangements were made to forward a total of twelve boys under this scheme to the Kemptville Agricultural School.

The following figures, relating to the London office alone, indicate how heavy at times is the work involved in connection with out correspondence. These figures are for the twelve months ending October, 1926:

Number of inward letters received	30,871
Number of outward letters	38,223
Number of callers interviewed	8,563

These figures are all considerably in excess of last year's totals.

In addition to keeping the opportunities of Ontario prominently before 3,500 shipping agents, who influence settlement to a large extent this office has endeavoured to advance Ontario industries on every opportunity. One plan adopted was to utilize the window space of the office on the Strand, which is one of the busiest thoroughfares in the world, to display Ontario products, making frequent changes in order to give a fair representation and show the variety of the output of the Province. Special attention has been given to emphasizing the mineral resources of Ontario, especially among financial and mining men. These efforts have aroused a great deal of inquiry.

During the year 151,405 copies of booklets descriptive of Ontario have been distributed through this office, besides thousands of leaflets and other publicity matter. Cinemetographs have been in constant use not only through our portable machine, but through circulation among the motion picture houses. Lantern slides are also loaned to school masters, lecturers and others.

This office renders assistance in supervising the exhibits from the Province of Ontario at the London Dairy Show and at the Empire Fruit Show. At both of these shows Ontario products won many prizes and the publicity resulting was of great advantage to the Province.

AGRICULTURAL REPRESENTATIVE BRANCH

Office Work

The following table shows statistically the extent to which the local office is used by the farmers in the various counties of the Province:

County	No. of Letters Received	No. of Letters Written	No. of Circular Letters Mailed	No. of Incoming Phone Calls	No. of Visitors at Office	No. of Meetings held in Office	No. of Bulletins and Reports Distributed	No. of Miles Travelled by Motor
Algoma	1,625	2,842	3,555	3,685	1,513	10	1,071	8,255
Brant	1,153	1,696	9,393	627	2,227	24	1,615	9,880
Bruce	3,500	3,000	9,500	2,500	2,000	42	6,000	19,000
Carleton	2,000	1,000	9,000	1,500	500	12	400	15,000
Dufferin	2,800	2,200	5,000	1,500	2,000	6	1,000	8,500
Dundas	1,850	1,650	5,000	1,600	1,250	125	650	10,000
Durham	1,769	1,960	11,019	856	1,179	40	900	10,760
Elgin	2,220	2,200	16,229	1,524	2,271	93	11,000	10,040
Essex	4,704	3,896	37,605	2,849	4,394	......	8,992	......
Frontenac	1,881	1,170	6,662	1,645	985	90	773	10,396
Glengarry	1,950	2,100	3,100	285	1,800	41	......	10,331
Grenville	1,091	974	5,981	1,027	538	7	850	11,600
Grey	2,285	5,090	13,400	1,500	2,850	100	1,000	26,500
Haldimand	1,226	1,214	3,991	1,240	861	3	3,200	12,200
Halton	3,589	5,898	12,092	2,651	2,830	13	1,393	14,000
Hastings	2,680	2,400	8,300	1,974	2,076	85	3,350	14,700
Huron	2,756	1,702	32,704	1,356	942	......	8,000	19,020
Kenora	1,428	1,119	4,108	583	2,137	8	......	8,563
Kent	3,400	3,800	25,000	2,900	3,117	47	2,000	14,700
Lambton	2,763	2,690	4,239	1,342	2,613	12	365	15,000
Lanark	1,614	1,055	1,095	637	796	35	100	14,950
Leeds	2,485	3,110	9,000	1,180	1,164	30	1,640	18,081
Lennox and Addington	2,650	1,600	2,000	1,500	1,350	35	575	8,000
Lincoln	941	1,217	5,395	1,077	1,148	41	708	18,895
Manitoulin	1,042	1,192	2,552	1,003	1,411	15	350	9,455
Middlesex	1,823	1,643	8,681	2,430	3,286	37	2,745	27,450
Muskoka and Parry Sound	1,527	1,832	13,862	900	533	9	291	9,457
Norfolk	2,325	1,800	8,465	1,750	2,190	45	330	12,287
Northumberland	1,625	2,025	6,105	1,420	924	12	625	13,000
Ontario	1,800	1,800	10,000	1,500	1,100	30	800	10,000
Oxford	3,079	3,843	15,327	1,759	3,597	33	4,748	15,755
Peel	3,300	3,728	11,556	7,000	5,467	39	3,000	21,156
Perth	2,000	1,498	3,490	1,095	1,250	90	675	11,931
Peterborough	1,115	1,115	4,500	946	1,000	35	356	10,425
Prescott and Russell	2,240	2,260	12,350	2,120	1,570	10	6,500	13,403
Prince Edward	1,218	1,114	2,540	2,250	2,310	30	1,100	7,500
Rainy River	1,267	1,156	6,826	1,829	2,281	20	749	12,314
Renfrew	1,573	2,944	2,416	959	1,010	26	415	7,000
N. Simcoe	2,142	1,836	5,385	1,224	918	11	570	8,400
S. Simcoe	1,450	1,130	3,584	754	1,410	14	235	13,240
Timiskaming	1,685	1,983	2,746	1,000	1,260	......	639	7,500
Sudbury	1,460	1,200	3,055	918	976	5	369	7,110
Fort William	1,154	1,197	2,714	1,580	1,254	4	317	15,916
Port Arthur	473	544	2,000	1,193	864	......	385	12,000
Victoria	1,542	1,365	4,685	993	2,110	19	856	8,063
Waterloo	1,600	1,700	8,392	2,560	2,223	60	600	19,550
Welland	2,300	1,325	2,605	1,150	1,042	20	1,200	9,000
Wellington	2,066	2,376	9,289	778	1,477	42	5,041	15,600
Wentworth	2,000	2,200	8,000	1,550	5,050	24	6,800	30,000
York	2,848	3,635	5,057	1,725	2,406	35	1,625	17,854
Total	101,014	104,024	409,550	79,924	91,460	1,564	96,903	653,737

The rural people of Ontario are making heavier demands each year upon the services of the Agricultural Representatives. Fortunately, their willingness to co-operate and assist has increased proportionately and therefore the accomplishments of the past year surpass those of any previous year.

Resignations have been received during the year from the Representatives in the Counties of Norfolk, Essex and Lincoln. The following transfers have been effected:

S. B. Stothers from Huron to Essex County.
A. A. Knight from Victoria to Leeds County.
E. F. Neff from Leeds to Lincoln County.
M. H. Winter from Renfrew to Victoria County.
A. F. Ross from Fort William to Norfolk County.

Senior Extension Work

Live Stock Improvement.—The Better Live Stock Campaign inaugurated seven years ago has since been actively carried on in all counties, the office of the Agricultural Representative acting as a clearing station for the sale and purchase of pure-bred breeding stock. The live stock breeders and the provincial and federal live stock branches have been active co-operators in the Better Stock Campaign.

Cattle—Cow Testing.—For some years cow-testing work has been carried on in Ontario under the direction of the Federal Department of Agriculture, but on February 1st, 1926, the testing work in Ontario was taken over by the Ontario Department of Agriculture. This work is being organized and promoted by the County Representatives with the active co-operation of the Dairy and Live Stock Branches. Broadly speaking, the part to be taken by the farmer and the Department is as follows:

By the Producer:

1—Each farmer to supply his own weighing and sampling equipment such as *scales*, *milk box*, *sample bottles*, and *dipper*.

2—To weigh and take a sample of milk of each cow night and morning on three days each month, say the 10th, 20th and 30th, and record weights on forms supplied.

3—To deliver samples to testing station or centres as determined and to secure return of box and empty bottles.

4—To agree to keep a record for the full year—lactation period—of every cow in the herd.

5—To pay a fee of fifty cents per cow per year.

By the Department of Agriculture:

1—To assist in organization work, whether for individual farmers or in the formation of Cow Testing Associations and to accept samples from either for testing.

2—To do such clerical work in the keeping of records as may be necessary and to interpret the results.

3—To supply suitable accommodation and testing equipment such as Babcock tester, glassware, sulphuric acid, corrosive sublimate preservative tablets, record forms, herd books, etc., and test each sample for butter-fat once each month.

4—The testing to be done by the staff of the Dairy Branch at any one of the following places:
  (a) Cheese factories.
  (b) Creameries.
  (c) Offices of Agricultural Representatives.
  (d) Special testing stations.

5—To make provision for the issuing of a production certificate to any cow which reaches a satisfactory standard of production of milk and fat in twelve consecutive months and to maintain a cow testing register for all cows which have qualified.

Previous to the Department taking over Cow Testing work on February 1st last there were twenty so-called Testing Associations with a membership of 648 farmers and 7,598 cows under test. Of this number 6,341 cows were being tested under Federal supervision free of charge. Since the inauguration of the Provincial policy, 517 farmers in twenty-two counties have listed 6,013 cows on a yearly testing basis. To date there are thirteen active Cow Testing Associations formed with 365 members and 3,591 cows.

Since Cow Testing under the new policy has not been in effect a year as yet it has been found difficult to secure comparative figures to show the results of herds for a full lactation period. However, the following statistics have been compiled to illustrate the value of cow testing work.

In Haldimand County for a period of seven months—May to November, 1926, inclusive—with thirty-five herds and 294 cows under test, the following information is quite striking:

Average Production Per Cow

	Milk	Butter Fat
High—Herd A	8,593 pounds	277.6 pounds
Low—Herd B	5,259 "	182.5 "
High—Cow A	11,160 "	354.4 "
Low—Cow B	3,243 "	112.5 "

The difference between the high herd owned by A and the low herd owned by B per cow during the seven months was 3,334 pounds of milk which valued at $1.50 per hundred weight means $50.01 per cow. In a herd of ten cows it means an additional revenue of over $500.00 for herd owner A. Herd owner B by eliminating the low producers could in a few years increase his herd production materially.

The Norfolk County Cow Testing Association was organized in March, 1926, with 125 members and 867 cows under test.

Comparison of Best and Poorest Cow Under Test for Period of Nine Months, March—December, 1926

	Total Pounds Milk	Value of Milk	Total Pounds Butterfat	Average per cent. Butterfat
Best cow	14,808	$303.56	561	3.7%
Poorest cow	3,498	82.20	149	4.3%
Difference	11,310	$221.36	412	.6%

COMPARISON OF 100 BEST COWS AND 100 POOREST COWS FOR PERIOD OF NINE MONTHS

	Average Pounds Milk	Average Pounds Butterfat	Average per cent. Butterfat
100 best cows	9,256 pounds	319.7	3.5
100 poorest cows	6,211 "	202.7	3.25
Difference	3,045 pounds	117.0	.25

Value of increase, $67.45.

NOTE.—Milk is valued at $1.95 per cwt. for 3.5 per cent. milk and 5 cents per 100 pounds added or deducted for each 1/10 of a point above or below 3.5 per cent.

In Peterborough County for a period of six months from May to October, 1926, inclusive, the average production of the best and poorest herds is as follows:

COMPARISON OF BEST AND POOREST HERD

	Number Cows	Pounds Milk	Average Test	Pounds Butterfat
Best herd	7	7,244	3.2	231.8
Poorest herd	10	4,782	3.4	162.5
Difference	....	2,462		69.3

Value of increase at $2 per cwt., $49.24.

COMPARISON OF BEST AND POOREST COW

	Pounds Milk	Value at $2 per cwt.	Per cent. Fat	Total Pounds Fat	Value at 35c per Pound
Best cow	8,304	$166 08	3.6	298.9	$104 61
Poorest cow	3,559	71 18	3.3	118.5	41 47
Difference	4,745	$94 90	.3	180.4	$63 14

COMPARISON OF TWENTY BEST AND TWENTY POOREST COWS

	Total Pounds Milk	Average Butterfat Test	Total Pounds Butterfat
Twenty best cows	7,622	3.19	242.1
20 poorest cows	4,478	3.36	148.8
Difference	3,144		93.3

The Agricultural Representative for Peterborough County says as follows *in reference to above: "The figures are interesting in that the average test of* the twenty cows classed as poor is slightly higher than the average of the twenty classed as good. It would appear that better methods of feeding might make some of the cows in the poorer class much higher producers and thus become more profitable to their owners."

The Wentworth Cow Testing Association was organized in June, 1924, with a membership of 123 and 1,385 cows enrolled. At the completion of one year's work it was found that the average milk production per cow in the association was 8,500 pounds.

Of the 1385 cows on test, 604 gave an average test below 3.25 per cent.
" " " 781 " " above 3.25 "
" " " 239 " " " 3.50 "
" " " 53 " " " 4.0 "

Comparison of the Best and Poorest Cow on the Basis of Whole Milk and Butterfat Production June, 1924—July 1925

	Whole Milk		Butterfat		
	Pounds of Milk	Value at $2 per cwt.	Per cent. Fat	Total Pounds Fat	Value at 40c per pound
Best cow	13,630	$272 60	3..8	540	$216..00
Poorest cow	5,135	102 70	2..3	118	47 20
Difference	8,495	$169 90	1..5	422	$168 80

From the above table it is quite striking that the best cow gives 8,495 pounds of milk—practically the average for the association—and 422 pounds of fat more than the poorest cow with a cash return of $169.90 more in one year.

Comparison of the 100 Best and 100 Poorest Cows on Basis of Whole Milk and Butterfat Production for Period June, 1924—July, 1925

	Average Pounds of Milk per Cow	Value at $2 per cwt.	Per cent. Fat	Average Pounds Butterfat per Cow	Value at 40c per Pound
100 best cows	10,606	$212 12	3.43	360	$144 00
100 poorest cows	6,546	130 92	3.35	229	91 60
Difference	4,060	$81 30	.08	131	$52 40

If we were to take three farmers on one side of the road with ten cows each of the first class and three farmers on the other side of the road with ten cows each of the second class, the farmers who had the good cows would each receive $812.00 more money for their product than those possessing the poorer cows.

Results of Farmers Completing their Second Year of Testing—Happily these same men have carried on their testing and our Agricultural Representative reports as follows: "The outstanding lesson which we have been able to find from men who have completed their two years' records is that the average butter-fat test for the herd over the year previous has invariably increased, although the milk production has not increased in many instances. I believe the reason for this is the fact that farmers having low tests find that they have cows which are producing a good flow of milk but which at the same time are low testers. They got rid of these older animals which were producing a large amount of milk and as a result the young animals which came on were not able to give as high an average."

The following are the results of the increased average butter-fat test of thirteen farmers who have sent in tests every month for two years in the Wentworth Cow Testing Association:

	July, 1924-July, 1925	July, 1925-July, 1926	Increase
	Per cent.	Per cent.	Per cent.
Farmer No. 1	3.1	3.34	.24
" 2	3.6	3.8	.2
" 3	3.1	3.3	.2
" 4	3.2	3.37	.17
" 5	3.0	3.1	.1
" 6	3.7	3.7	.0
" 7	3.1	3.3	.2
" 8	3.59	4.3	.71
" 9	3.1	3.4	.3
" 10	3.5	3.57	.07
" 11	3.36	3.38	.02
" 12	3.4	3.46	.06
" 13	3.2	3.85	.65

TABLE SHOWING GROUP OF EIGHT FARMERS WITH AVERAGE PRODUCTION OF MILK AND BUTTERFAT DURING 1924-25 AND 1925-26 IN WENTWORTH COUNTY

	1924-25	1925-26	Average Increase per Cow
	Pounds	Pounds	Pounds
Farmer A—Butterfat	241	288	47
Milk	7,956	9,566	1,610
Farmer B—Butterfat	322	412	90
Milk	8,610	10,891	2,281
Farmer C—Butterfat	316	329	13
Milk	8,792	9,665	873
Farmer D—Butterfat	234	264	30
Milk	7,693	8,001	308
Farmer E—Butterfat	297	328	31
Milk	8,673	9,540	867
Farmer F—Butterfat	241	268	27
Milk	7,116	7,928	812
Farmer G—Butterfat	285	367	82
Milk	8,861	10,458	1,597
Farmer H—Butterfat	244	322	78
Milk	7,595	9,857	2,262

The Agricultural Representative for Wentworth remarks: "These farmers made careful elimination of certain cows and good buying of others and with improved feeding methods have increased their butter-fat test and also milk production."

The figures for the past year in Wentworth County have just been compiled and it is interesting to note the comparison between the 100 best cows in 1924-25 with the 100 best cows in 1925-26 and see whether any progress has been made.

COMPARISON OF 100 BEST COWS, 1924-25 WITH 100 BEST COWS, 1925-26

	Average Pounds of Milk per Cow	Value at $2.00 per Cwt.	Average Per Cent. Fat	Average Pounds of Butter-fat per Cow	Value of Fat at 40c. per Pound
100 Best Cows, 1924-25	10,606	$212 12	3.43	360.00	$144 00
100 Best Cows, 1925-26	11,519	230 38	3.41	389.18	155 67
Increase	913	$18 26	.02	29.18	$11 67

COMPARISON OF 30 POOREST COWS, 1924-25 WITH 30 POOREST COWS, 1925-26

	Average Pounds of Milk per Cow	Value at $2.00 per Cwt.	Average Per cent. Fat	Average Pounds of Butter-fat per Cow	Value of Fat at 40c. per Pound
30 Poorest Cows, 1924-25	5,346	$106 92	3.0	171	$68 40
30 Poorest Cows, 1925-26	5,733	114 66	3.64	206.5	82 60
Increase	387	7 74	.64	35.5	$14 20

In submitting these figures the Agricultural Representative states that: "The average of the 100 best cows has increased by nearly 1,000 pounds of milk over the same number the year previous. Probably the outstanding lesson is the showing made by the thirty poorest cows over the same number the previous year in which is shown an increase of nearly 400 pounds of milk and thirty-five pounds of butter-fat."

Swine—The percentage of select hogs is steadily increasing in Ontario and in some sections there is quite a marked increase while in others the percentage increase is not so great. Many grading demonstrations and special swine courses have been held and these have done much to popularize and explain the value of hog grading. In conjunction with the Provincial and Federal Live Stock Branches, six bacon hog fairs were held. The following table gives the statistics in connection with the Bacon Hog Fairs held in Ontario during 1926:

County	Place	Total Number Entries at Fair	Total Number Hogs Shipped to Market	Total Attendance
Hastings	Stirling	65	90	250
Haldimand	Nelles' Corners	67	149	325
Northumberland	Colborne	75	172	450
Perth	Mitchell	103	46	300
Simcoe	Stayner	98	240	300
Waterloo	Kitchener	75	64	700
Totals		483	761	2,325

During this year the Representatives organized 103 Bacon Hog Clubs and the Provincial Live Stock Branch supplied pure-bred boars for these clubs. In some counties a record of performance of these boars has been made and invariably the results show that some excellent breeding boars have been distributed, and they are having a marked influence in improving the quality of Ontario hogs.

Sheep—Sheep extension work has been carried on during 1926 with the co-operation of the sheep promoters of the Dominion Live Stock Branch. Docking, castrating and dipping demonstrations have been held in various counties and permanent dipping tanks have been installed as follows:

County	No. of Tanks Installed, 1926	No. of Sheep Dipped
Brant	2	....
Bruce	9	1,090
Carleton	2	100
Dufferin	2	700
Durham	7	....
Frontenac	5	....
Grenville	4	200
Grey	11	....
Hastings	12	1,200
Huron	7	....
Leeds	1	105
Lincoln	3	1,684
Middlesex	8	....
Northumberland	12	1,387
Ontario	6	618
Oxford	8	....
Peterborough	3	350
Prescott and Russell	1	25
Rainy River	3	1,345
South Simcoe	3	5,500
Victoria	14	1,493
Welland	1	....
Wellington	9	5,268
Totals	134	21,065

In co-operation with the Provincial and Federal Live Stock Branches, Lamb Fairs were held in four counties and 1,776 lambs were exhibited and very substantial prizes paid and from these Fairs, 1,643 market lambs were sold at a premium. In some counties, Ram Clubs have been organized and in many sections, high class purebred rams are heading flocks of sheep.

The following table gives statistics of the Lamb Fairs:

County	Place Where Fair was Held	Number of Entries	Number of Lambs Shipped to Market
Lanark	Middleville	390	285
Lanark	Franklin	356	304
Peterborough	Havelock	140	96
Manitoulin	Little Current	254	375
Manitoulin	Manitowaning	370	392
Rainy River	Emo	266	191
Totals		1,776	1,643

Poultry—During the past year the interest in poultry has been very keen and the Representatives have had many requests for assistance in poultry culling and management. In some counties intensive culling campaigns have been carried on and successful co-operative shipments of culls have been made. Culling schools have again been organized and junior farmers trained in poultry culling. These young men have then culled several flocks in the county at a nominal charge per bird. In all poultry extension work the Poultry Department of the Ontario Agricultural College has given excellent advice and practical assistance.

The following table gives the statistics according to counties:

POULTRY CULLING

County	Number of Demonstrations	Total Attendance	Number of Flocks Culled	Total Birds Handled
Algoma	3	62	8	785
Brant	..	...	72	4,787
Bruce	..	...	145	13,138
Carleton	2	65	15	1,000
Dufferin	12	67	12	920
Dundas	6	100	50	5,500
Durham	10	85	29	3,357
Elgin	4	63	83	7,080
Essex	9	78	9	585
Frontenac	18	59	18	2,009
Glengarry	10	171	41	3,694
Grenville	15	170	20	715
Grey	7	300	24	2,300
Haldimand	6	93	6	840
Halton	3	175	32	3,257
Hastings	10	300	10	500
Huron	..	...	265	22,643
Kenora	1	20	43	1,600
Kent	22	264	90	9,057
Lambton	11	84	...	......
Lanark	13	62	13	1,326
Leeds	12	185	32	3,300
Lennox and Addington	9	122	21	650
Lincoln	5	60	19	2,000
Manitoulin	..	...	81	4,267
Middlesex	12	315	60	6,400
Muskoka and Parry Sound	11	219	19	1,685
Norfolk	30	112	30	2,053
Northumberland	16	78	...	2,005
Ontario	9	22	13	1,500
Oxford	..	...	180	14,760
Peel	4	73	69	5,732
Perth	5	125	13	841
Peterboro	3	27	5	455
Prescott and Russell	7	175	9	648
Prince Edward	5	75	5	1,003
Rainy River	5	58	16	564
Renfrew	10	223	21	1,429
North Simcoe	7	215	18	655
South Simcoe	5	100	10	1,000
Fort William	23	146	33	973
Port Arthur	3	75	3	300
Waterloo	1	30	20	2,200
Welland	12	195	12	1,500
Wellington	9	159	9	840
York	..	...	13	1,200
Total	365	5,007	1,696	143,053

FIELD CROP IMPROVEMENT

Alfalfa Campaign—During the winter of 1925-26, an intensive alfalfa campaign was carried on in the Province of Ontario. The Alfalfa Campaign Committee made a careful survey of the Province and outlined plans and provided the necessary organization for conducting the campaign. It was decided to have a Province-wide campaign but to concentrate on the Counties of Elgin, Perth, Dundas and Carleton. In the Counties of Elgin and Perth there was a very marked increase in the acreage of alfalfa seeded in 1926 and in Dundas and Carleton the acreage of alfalfa was also materially increased. Over 200 per cent. increase in these four counties was indicated by the information coming to the offices of the Agricultural Representatives. The County Representatives after analyzing local conditions arranged for holding meetings, sent out circular letters and bulletins and assisted in locating good seed and securing nitro-cultures. The result was an increase of about 75 per cent. in the acreage sown to alfalfa during the year. Figures compiled by the Agricultural Representatives indicate a new seeding of 378,663 acres. After allowing for winter killing to the extent of 68,455 there was left according to this estimate 753,267 acres. This compares with an estimate of 748,473 acres by the Statistics Branch. Thus a substantial permanent addition has been made to this important fodder crop.

The large increase in the alfalfa acreage is very gratifying and was brought about largely by the activities of all those interested in the campaign. The reasonable price of alfalfa seed as compared with red clover seed and the recognition of the value of alfalfa as a hay crop were also influential factors in the increased acreage. The county newspapers and agricultural press gave strong support to the campaign and published many valuable articles regarding alfalfa. Service Clubs, Boards of Trade and Chambers of Commerce also supported the campaign. The following table shows the numbers of alfalfa nitro-cultures distributed to farmers during 1924, 1925 and 1926.

	1924	1925	1926
Ottawa	1,090	1,344	3,402
Guelph	3,693	3,445	10,861
Totals	4,783	4,789	14,263

These figures further substantiate the statement that the campaign was a decided success and soon we may expect the Province of Ontario to have well over one million acres of alfalfa.

In 1925, the Province of Ontario stood eighth in acreage of alfalfa as compared with the various States of the United States; being exceeded only by Nebraska, Kansas, Montana, Colorado, Utah, Idaho and California. These states are all west of the Mississippi and thus Ontario leads in alfalfa acreage as compared with any state east of the Mississippi valley.

The production of hardy alfalfa seed has been an important cash crop with many Ontario farmers, particularly in the Counties of Peel, York and Halton which produce approximately sixty-five to seventy per cent. of the seed grown in Ontario. In comparison with the States of the Union, Ontario stands second in the production of alfalfa seed being surpassed only by the State of Utah.

At the present rate of increase we may soon expect Ontario to lead in acreage of alfalfa and also in the production of seed.

European Corn Borer—Due to the ravages of the corn borer the acreage of corn in the corn growing counties has been materially decreased and the possibilities are that the acreage for 1927 will be further decreased. An Act for the Eradication of the Corn Borer was passed in 1926 and as a result of this Act the Counties of Essex, Elgin, Kent, Lambton, Middlesex, Norfolk, Oxford and Prince Edward have appointed inspectors to assist in the extermination of the borer and enforce the Act. These inspectors are working under the direction of the Provincial Entomologist. Owing to the very wet fall it has been impossible for farmers to clean up and plow their corn fields. However, in the majority of counties the inspector has the support of the people in enforcing the Act. In all the infested counties the Representatives are actively carrying on an educational campaign for the destruction of the corn borer.

Spray Service

In 1925, a special spray service was inaugurated in eight counties and this year the same service was continued and extended to eighteen counties. The Representatives in the fruit growing counties studied their problem and received assistance and advice from Fruit Growers' Associations, Vineland Experimental Station, the Ontario Agricultural College and the Fruit Branch, as well as prominent fruit growers. Special spray meetings were arranged, timely spray bulletins prepared and distributed and regular personal visits made to members of the spray ring. The County Representatives have received many letters from growers expressing appreciation of the service and requesting that it be continued in 1927. In all cases where the spray service recommendations were followed the percentage of No. 1 apples was increased, and in many cases as high as ninety-five per cent. clean fruit was reported.

The following table gives statistical information:

County	Number of Applications	Number of Men Receiving Service
Brant	19	19
Dundas	49	49
Durham	67	67
Grenville	7	7
Grey	5	5
Hastings	12	7
Huron	27	27
Leeds	13	13
Northumberland	55	55
Ontario	10	10
Peel	7	7
Halton	35	35
Lincoln	201	201
Kent	12	12
Lambton	67	49
Middlesex	45	30
Norfolk	247	247
Prince Edward	151	151
Wentworth	25	25
Total	1,054	1,016

Experimental and Demonstration Work—In co-operation with other departments the County Agricultural Representatives carry on much experimental and demonstration work. These experiments and demonstrations cover a wide range of subjects such as fertilizers, variety tests of grains, fruits and vegetables and experiments for the control of various diseases and insects.

Drainage—In many counties the farmers are interested in under-drainage but are waiting until economic conditions adjust themselves and thus make it possible for them to secure tile at a reasonable price.

Farm Labour—In counties where there is no permanent employment office the Representative acts as an official of the Immigration Branch and assists the farmers in securing suitable help. Reports would indicate that a fairly good class of farm labour is being secured by Ontario farmers.

County Advisory Agricultural Councils—These boards appointed by the county councils have been very active in some counties and are of material assistance to the County Representative. They usually meet two or three times a year and assist in planning and carrying out the community and county projects.

Farmers Educational Tours—In many counties the Representatives organize farmers' tours. These trips are highly educational and also serve as an advertisement for the counties taking the trips. In Southwestern Ontario the Counties of Essex, Kent and Lambton have an annual tour to some point in the United States. The County of Durham had a farmers' bus trip around Lake Ontario and the farmers of Ontario County had a trip to the O.A.C., Guelph. All of the counties assisted in organizing for the Farmers' Week at the Ontario Agricultural College, Guelph.

County Exhibits at C.N.E., Toronto

This year the Counties of Dufferin, Durham, Northumberland, Grey, Hastings, Kent, Lincoln, Norfolk, Peel, Wellington and Wentworth had exhibits at the Canadian National Exhibition. These counties all had excellent exhibits displaying the products of their farms and industries which advertised their potentialities. These highly educational exhibits were viewed and very favourably commented on by many interested spectators both rural and urban. These very attractive county exhibits were arranged and displayed by the County Agricultural Representatives assisted by the county council and local agricultural organizations. Free space was provided by the Canadian National Exhibition but each county was responsible for providing and arranging their own display material.

JUNIOR EXTENSION WORK

Rural School Fairs—The value and popularity of Rural School Fairs, continue to grow throughout Ontario. In spite of a very wet and disagreeable school fair season the number of entries was normal and the enthusiasm of the children great. The quality of the exhibits was also very good considering the poor weather at harvesting time. During the season of 1926, there was a total of 279,381 entries or an average of 522 per school fair. This year, 4,655 schools took part in 535 school fairs which were attended by 167,504 children and 210,014 adults. The following quantities of high class seeds, eggs and baby chicks were distributed by the Ontario Department of Agriculture for School Fair purposes during 1926:

POTATOES	Irish Cobblers	595 bags	
	Green Mountains	351 "	
	Dooleys	375 "	
Total		1,321 bags,	distributed in 5-lb. lots to 23,778 pupils
OATS	O.A.C., No. 72	50¼ bushels	
	O.A.C., No. 3	10½ "	
	O.A.C., No. 144	16½ "	
	Banner	101½ "	
	Alaska	2½ "	
Total		181¼ bushels	distributed in ¾-lb. lots to 6,562 pupils
BARLEY	O.A.C., No. 21	112½ bushels	distributed in 1-lb. lots to 5,400 pupils
WHEAT	Marquis	78 "	" " " 4,680 "

TOTAL PUPILS RECEIVING POTATOES AND GRAIN, 40,420

Beets, Carrots, Onions, Parsnips	60,000 packages
Mangels and Turnips	17,700 "
Corn—Field and Sweet	23,400 "
Flowers	69,400 "
Eggs	13,787 dozen
Baby Chicks	4,795 chicks

In 1926, there were 40,420 Ontario farm boys and girls receiving small lots of grain and potatoes. The seed potatoes were fully certified and were the best obtainable in the Province of Ontario. The seed grain was registered and was of a very high quality. It is almost impossible to estimate the value of field crop improvement brought about by the distribution of this high class seed to so many farms in the Province. The distribution of these small lots of seed has in many cases been the means of many farmers beginning to produce high class seed grain.

SCHOOL FAIR STATISTICS

County	No. of fairs	No. of schools	No. of pupils	No. of plots	No. doz. eggs distri-buted	No. of baby chicks	No. of entries	Attendance	
								Chil-dren	Adults
Algoma	11	56	1,774	4,022	440	......	4,768	2,335	2,875
Brant	8	59	1,630	2,270	175	......	4,024	2,135	1,710
Bruce	16	156	3,728	5,356	438	......	6,499	5,560	6,800
Carleton	11	94	2,359	3,937	377	......	6,198	4,405	6,225
Dufferin	8	74	1,265	1,950	143	......	2,953	1,575	1,495
Durham	12	91	2,203	2,785	208	270	4,410	2,930	3,625
Dundas	9	112	2,850	2,193	158	526	4,630	3,075	3,950
Elgin	14	135	3,665	4,379	646	......	6,421	3,711	3,460
Essex	14	114	4,782	4,954	303	300	8,662	5,400	3,220
Frontenac	11	122	2,110	4,012	176	......	4,161	3,550	3,000
Glengarry	9	122	3,626	5,999	117	......	3,609	4,050	3,100
Grenville	6	80	1,760	1,856	107	......	3,568	2,500	2,800
Grey	19	206	4,957	6,114	422	......	9,975	6,415	13,400
Halton	8	44	1,867	4,692	110	416	6,222	4,550	3,750
Haldimand	7	86	2,160	3,156	168	......	3,488	2,315	3,725
Hastings	10	140	2,800	4,125	170	......	5,445	3,715	3,685
Huron	20	164	3,000	3,000	384	......	11,677	7,200	6,950
Kenora	12	29	700	2,380	170	......	2,606	828	517
Kent	12	157	4,813	6,047	765	......	8,262	3,575	4,750
Lambton	13	147	3,467	6,362	567	......	9,123	4,075	10,700
Lanark	9	86	1,622	1,410	210	......	4,815	3,400	4,300
Leeds	10	120	2,341	3,661	133	330	6,256	3,275	6,700
Lennox and Addington	10	91	1,843	3,200	112	......	2,814	2,250	2,325
Lincoln	7	47	2,359	2,142	217	......	5,253	2,740	4,350
Manitoulin	11	59	1,500	2,617	298	......	3,313	1,700	1,700
Middlesex	11	107	2,785	3,540	359	......	7,070	4,840	10,750
Muskoka and Parry Sound	20	130	4,342	3,748	594	......	15,040	3,800	8,555
Norfolk	8	104	2,700	3,598	222	......	3,189	2,875	4,050
Northumberland	9	99	2,365	33,35	319	10	4,180	3,285	5,950
Ontario	18	114	3,650	4,532	282	......	13,825	5,675	8,525
Oxford	10	105	4,973	4,872	180	275	9,981	4,950	5,500
Peel	6	70	2,230	2,411	190	730	3,847	4,250	3,900
Perth	8	60	1,830	2,430	145	......	8,700	1,620	1,580
Peterboro	8	58	2,405	2,200	205	......	2,873	2,150	2,550
Prescott and Russell	12	71	2,128	2,946	158	......	2,768	3,175	4,650
Prince Edward	8	83	1,725	3,354	223	......	3,168	1,820	2,375
Rainy River	13	73	3,339	3,021	316	......	3,890	2,665	1,615
Renfrew	11	70	1,806	2,591	165	......	4,094	2,815	2,095
Simcoe South	8	96	2,753	4,305	416	......	5,306	3,100	3,650
Simcoe North	9	97	4,533	1,174	359	......	5,244	2,570	2,650
Sudbury	10	79	2,390	1,921	469	......	4,498	2,660	835
Timiskaming	12	30	788	1,031	123	......	1,800	830	755
Port Arthur	8	34	969	1,994	137	......	2,132	1,160	770
Fort William	8	27	750	1,374	85	......	1,990	1,020	760
Victoria	14	100	2,480	3,752	327	......	5,525	3,225	3,150
Waterloo	7	69	2,600	3,124	....	1,938	5,011	4,365	5,600
Welland	8	76	3,703	3,703	236	......	4,668	4,460	3,225
Wellington	12	112	2,298	3,208	250	......	7,029	2,770	4,312
Wentworth	8	72	3,651	3,474	177	......	5,958	4,710	3,050
York	12	128	5,018	6,000	459	......	8,443	5,450	10,050
Total	535	4,655	136,227	180,000	13,787	4,795	279,381	167,504	210,014

Educational Features—In addition to the regular classes the School Fair committees have arranged for special competitions and demonstrations to create interest and develop a spirit of rivalry along certain definite lines. Some of the major competitions were Health, Public Speaking, Health Poster, Stock Judging, Stock Naming, First Aid, Home Canning, and Poultry Culling. In each school the high pupil receives a Certificate of Honour signed by the Minister of Agriculture and the local Agricultural Representative.

In some cases, School Fairs are held jointly with the local fall fairs. Generally speaking, these school fairs materially increase the attendance and interest of the fall fairs but the children do not have the same incentive to work as they feel that they are a side line of the fall fair and the day does not mean so much to tbem as where they have a fair of their own.

This year all the county representatives report that they have received excellent support and co-operation from the local trustees, ratepayers, agricultural organizations and the Department of Education represented by school teachers and public school inspectors.

Championship School Fairs—These Championship School Fairs are usually held in conjunction with one of the larger fall fairs located in the central part of a county and this arrangement seems to work out to the mutual satisfaction of all concerned. By bringing to one central point the champion pupils and champion exhibits much good is accomplished. The pupils and adults have an opportunity of mingling together and there is a tendency toward developing a better county spirit. This year Championship School Fairs were held in the following counties and districts: Brant, Carleton, Dundas, Elgin, Frontenac, Halton, Kenora, Lanark, Manitoulin, Norfolk, Oxford, Perth, Peterborough, Rainy River, Victoria, Welland and Wentworth. In many other counties school fair champions were brought together to decide the county champion or championship team in such contests as public speaking, live stock judging or home canning.

Poultry Breeding Centres—The Ontario Poultry Breeding Centres supervised by the county representatives not only supply eggs and baby chicks for school fair purposes, but also supply neighbouring farmers with eggs and breeding stock. During the 1926 season farmers ordered 7,160 dozen eggs and bought 1,233 cockerels for breeding purposes. Each year poultry extension men from the Poultry Department of the Ontario Agricultural College inspect the breeding station flocks and cull them, thus eliminating any off-type or inferior birds. This year most of the breeding station birds were blood tested for white diarrhoea. The Ontario Agricultural College and the Kemptville Agricultural School supplied high quality male birds for the use of the breeding stations. School pupils had the choice of three breeds, namely, Barred Rocks, White Wyandottes or White Leghorns. The following statistics show according to breed the number of dozen eggs and baby chicks distributed:

Breed	Number Dozen Eggs	Number Baby Chicks
Barred Plymouth Rocks	12,829	3,747
White Wyandotte	402	78
White Leghorn	556	970
Totals	13,787	4,795

Baby chicks were distributed in the following counties: Durham, Dundas, Halton, Essex, Leeds, Northumberland, Oxford, Peel, Waterloo.

Poultry Breeding Stations

Table of Poultry Breeding Station Statistics for 1925

County	No. of P.B. Stations	No. of Hens and Pullets	No. of Cockerels	No. Dozen Eggs for School Fairs	No. Dozen Eggs to Farmers	No. of Cockerels to Farmers
Algoma	5	360	18	191	112	18
Brant	5	331	20	175	...	8
Bruce	6	740	31	466	249	21
Carleton	7	410	25	379	146	67
Dufferin	4	250	17	101	54	11
Dundas	4	930	20	160	215	20
Durham	6	560	15	208	238	8
Elgin	8	1,005	42	647	345	88
Essex	2	225	14	306	500	...
Frontenac	4	529	18	180	125	24
Glengarry	2	125	5	117	34	17
Grenville	3	295	22	101	51	5
Grey	8	470	25	425	187	18
Haldimand	1	230	12	155	124	65
Halton	4	420	14	110	410	35
Hastings	2	350	15	241	360	...
Huron	2	395	17	275	35	15
Kenora	4	188	9	170	51	9
Kent	4	730	33	620	510	74
Lambton	6	705	28	550	...	77
Lanark	4	405	16	210	...	...
Leeds	8	1,003	30	134	225	21
Lennox and Addington	1	150	11	112	136	31
Lincoln	..	...	...	...	...	...
Manitoulin	8	524	21	302	...	41
Middlesex	6	555	32	346	370	36
Muskoka and Parry Sound	6	186	14	596	...	...
Norfolk	2	350	6	222	...	...
Northumberland	2	390	34	306	28	6
Ontario	4	699	26	282	261	31
Oxford	4	445	26	150	50	58
Peel	5	407	21	324	439	46
Perth	1	300	12	100	300	30
Peterboro	2	205	10	205	140	5
Prescott and Russell	4	288	15	158	115	16
Prince Edward	4	939	23	223	...	...
Rainy River	10	382	23	335	29	26
Renfrew	7	292	18	167	114	32
North Simcoe	6	360	24	381	294	12
South Simcoe	4	500	28	416	130	50
Sudbury	5	275	14	470	...	...
Timiskaming	..	...	...	...	...	...
Fort William	3	152	8	75	27	5
Port Arthur	2	220	12	130	...	...
Victoria	4	370	20	313	136	32
Waterloo	4	934	27	378	...	...
Welland	6	500	21	248	305	...
Wellington	2	625	17	212	90	175
Wentworth	2	325	12	177	25	...
York	5	405	17	463	200	...
Total	208	21,434	938	13,012	7,160	1,233

Home Garden Contests

Home Garden Competitions were conducted in the following counties:

County	Number of Home Garden Contests	Number of Boys	Number of Girls
Algoma	2	22	24
Brant	2	33	17
Bruce	2	37	23
Dufferin	2	29	30
Dundas	1	12	20
Elgin	1	..	40
Essex	4	52	52
Frontenac	1	26	24
Glengarry	1	14	11
Grenville	2	27	19
Grey	4	62	38
Haldimand	2	29	21
Halton	2	40	16
Hastings	2	25	25
Huron	3	40	35
Kenora	2	24	24
Lanark	1	6	5
Leeds	2	26	24
Lennox and Addington	1	18	7
Lincoln	1	19	2
Middlesex	2	27	4
Muskoka and Parry Sound	2	31	19
Norfolk	2	20	21
Ontario	1	13	13
Peel	2	35	15
Peterboro	1	25	25
Prescott and Russell	2	26	21
Prince Edward	1	17	11
Rainy River	2	31	19
Renfrew	1	5	8
North Simcoe	1	21	16
Timiskaming	1	13	12
Victoria	2	38	12
Waterloo	1	20	30
Welland	1	41	12
Wellington	2	31	13
Wentworth	1	43	20
Total	63	978	728

The Home Garden Contest is specially arranged for teen-age girls for the purpose of creating interest in farming as well as providing a greater variety of vegetables for the use of the farm family. Gardens are judged during July and August and prizes awarded for the best kept gardens. The following varieties of seeds were distributed at 50 cents per package.:

Beans—Golden Wax.
Beets—Detroit Dark Red.
Cabbage—Copenhagen Market.
Carrots—Chatenay.
Citrons—Colorado Preserving.
Corn—Golden Bantam.
Cucumber—White Spine.
Lettuce—Grand Rapids.
Onions—Yellow Globe Danvers.
Pickling Onions—Barletta.
Parsnips—Hollow Crown.
Peas—American Wonder.
Radish—Scarlet White Tip Turnip.
Squash—Warty Hubbard.
Swiss Chard—Silver.
Spinach—Victoria.
Tomatoes—Bonny Best.
Onion Sets—Yellow.

Boys' and Girls' Clubs—During 1926 Boys' and Girls' Clubs were organized in ten counties. These clubs were organized for special purposes and in many cases were fostered by service organizations such as Rotary and Kiwanis. The following table shows according to counties the number of clubs organized during 1926:

County	Name of Club	Membership
Carleton	Ottawa Kiwanis Potato Club	45
	Ottawa Rotary Poultry Club	44
	Whyte Variety Test in Seed Grains	12
Essex	Soy Bean	87
	Dent Corn	102
Elgin	Jersey Heifer Club	10
Frontenac	Kingston Kiwanis Potao Club	30
Grenville	Brockville Rotary Potato Club	11
Grey	Sheep Club	7
Kent	Corn Club	85
Middlesex	Four Sheep Clubs	42
Leeds	Brockville Rotary Potato Clubs	30
Prescott and Russell	Ottawa Kiwanis Potato Club	28
North Simcoe	Barrie Kiwanis Potato Club	68
Renfrew	Renfrew Rotary Farm Boys' Potato Club	19
	Total Number of Clubs	18
	Total membership	620

The benefits and results of Boys' and Girls' Club work are very pronounced as is illustrated from the following extracts taken from the annual report of the Carleton County Representative:

"In the Potato Club one bag of certified Dooley potatoes was distributed to each contestant. In the Rotary Club one setting of pure-bred eggs of breeds specified was given to each contestant. In the variety test of seed grains, samples of oats of the following varieties, sufficient to plant five rows one rod long, were distributed: Gold Rain, Alaska, Banner, Victory, O.A.C. No. 144.

"Our Potato Contest was very successful. The object on the part of the Kiwanis Club was to have an opportuity to call on and make the acquaintance of our farmers with the aim in view of creating a better understanding between city and rural folk, also to help in the adoption of approved methods of potato culture by the boys in their teens. This contest also included boys from Russell County, and there were seventy-five boys in all, forty-five from Carleton and thirty from Russell. The boys were obliged to grow and care for the crop and exhibit one-half bushel at the Ottawa Winter Fair. A very attractive exhibit was displayed at the Ottawa Winter Fair, and we are pleased to report that forty-two of our forty-five contestants exhibited their potatoes at the Fair (twenty boys from Russell also exhibited their lots).

"The boys and their fathers were entertained at luncheon on Friday, November 26th, in Ottawa by the Kiwanis Club. There was a full turnout of the boys and their fathers or older brothers and in all there were 350 at the luncheon. This gathering had the opportunity of hearing Mr. W. B. Roadhouse, Deputy Minister of the Ontario Department of Agriculture, as the special speaker for the occasion. One of the contestants, Ritchie Bell, spoke in an able manner, surprising to many of the Kiwanians, of the appreciation of the boys in Carleton County for all the Kiwanians had done for them. The results were all that our fondest hopes anticipated. Most of our boys were greatly benefited by the acquaintance of their city friends and they also in, most cases, learned the benefits of using good seeds and following improved methods in growing potatoes. The club prizes were awarded at this very happy function.

"The results as gathered from our field inspection and records contributed by the boys point to the value of good seed and proper care. Where proper care was given, fair profits usually followed. In a few cases where losses were experienced, late blight and too wet and cold a spring were responsible. The largest yield of the contest was forty bushels from the one bag of seed and the grower Donald Graham, Britannia Bay, had a profit of $323.00 per acre. The winner of the contest, Arthur Stewart, of Kinburn, had a yield of thirty-six bushels, a profit of $247.00 per acre and a field score of ninety-two and exhibit score of eighty-eight, these being the highest scores in the contest. This same boy showed potatoes in the regular classes at the Ottawa Winter Fair and was awarded fifth place in a strong class. The Kiwanis Club and the farm boys expressed their appreciation of the contest and the better understanding it had created."

ROTARY POULTRY CONTEST

"The aim and object of this competition was the same as that by the Kiwanis Farm Boys' Potato Club, that a medium be established through which the members of Rotary could become better acquainted with families in Carleton County and that the rural people get better acquainted with men of the city, and also that our girls and boys on the farm endeavour to learn the poultry business.

"The contest is in two divisions, summer and winter. The summer contest was based on management from the time eggs were set till pullets were put in winter laying quarters. Improvement in conditions for poultry about the farm counted for most in the summer contest. It is gratifying to report that a number of the girls and boys received wonderful co-operation from their parents in improving the housing conditions for the home flock. We found ten new houses were erected or about to be erected. The winner of the contest, Alfred Kennedy, Dunrobin, seventeen years of age, remodelled an old building to conform to the most modern type of house and had his pullets housed in September and they were laying in October. One boy trapnested his flock of thirty pullets and by the end of October he had one pullet that had laid twenty-seven eggs on twenty-seven consecutive days. This boy was well acquainted with modern poultry practices before the contest started and although an expert with his flock did not score as high as the boy who brought the home flock from very ordinary conditions to a high standard.

"The Rotary Club entertained the girls and boys to a luncheon in the Chateau Laurier on Monday, November 22nd, at which function we had the privilege of hearing the Hon. J. S. Martin, who was the guest of the club and acted as special speaker for the function. A pleasing part of the programme was the fine style in which the appreciation of the contestants was expressed in two minutes speeches from Allan Seabrooke, North Gower; Miss Louise Gourlay of Carp, and Alfred Kennedy of Dunrobin. The girls and boys received many very fine prizes from the Rotary Club and the highest scoring individuals, Alfred Kennedy, Dunrobin, and Miss Louise Gourlay, Carp, received a letter from the Minister, entitling them to a two weeks' course at the Kemptville Agricultural School."

Junior Farmer Associations—In the Province of Ontario there are at the present time 110 Junior Farmer Associations with a total membership of 3,694. There are eight county associations with a membership of 857. The members of these associations are the brightest and keenest of our farm boys. The construction programmes carried out by these organizations are very effective from a community standpoint and are very influential in developing leadership among the members of the association. Some of the main features of the Junior Farmers' programmes have been as follows:

1—Stock and Crop Judging Competitions.
2—Plowing Competitions.
3—Debating Leagues.
4—Athletic Contests.
5—Dramatic Contests.
6—Public Speaking Contests.
7—Social Activities.
8—Community Improvement.
9—Tours and Excursions.

Encouraged by the inspiration and progressive work which accrued from the conferences held last year, Junior Farmer conventions were again held in Guelph and Kemptville and in addition one was arranged at Belleville for the central counties of Eastern Ontario.

Belleville, October 20th—About sixty delegates and members were present from the Counties of Victoria, Durham, Northumberland, Peterborough, Hastings, Prince Edward, and Lennox and Addington. The programme included addressed by Junior Farmer leaders from other counties and judging by the keen participation in discussion, we may expect an extension in Junior Farmer work in this area. The Belleville Kiwanis Club and the Hastings County Junior Farmer organizations co-operated in entertaining the visitors at luncheon at which Principal W. J. Bell, of the Kemptville Agricultural School addressed the gathering on "Some of the outstanding problems in Eastern Ontario Agriculture."

Kemptville, October 21st—In general arrangement this second annual convention was similar to the one held last year. It coincided with the girls' conference and part of the programme was conducted jointly. There was a notable difference between this conference and the first one. As reports were given by the delegates from the county and branch units it was evident that Junior Farmer work in the area had made excellent progress during the year and the 1925 meeting is given credit for contributing materially to this success. About fifty young men were in attendance.

Guelph, November 26th, 1926—The largest convention was held at Guelph as this is the heart of the most highly organized district. Over 100 delegates and members attended and many excellent suggestions were offered by the young men for the improvement of their organizations. The programme of this convention is included and is somewhat similar to those of the other meetings.

JUNIOR FARMER CONFERENCE

MASSEY HALL, O.A.C., GUELPH, FRIDAY, NOVEMBER 26TH, 1926

Morning Session

Chairman—N. C. McCully, St. Marys, Perth County

10.00 a.m.—Call to Order.
10.05 a.m.—Introductory Remarks—R. S. Duncan, Director, Agricultural Representative Branch, Toronto.
10.15 a.m.—What Extension Department, University of Toronto Can Offer Rural Organizations Such as Junior Farmer Associations—W. J. Dunlop, Director, Extension Department, University of Toronto, Toronto.
10.40 a.m.—Discussion.
10.45 a.m.—Assistance Offered by Extension Department, O.A.C.—L. Stevenson, Director of Extension, O.A.C., Guelph.
10.55 a.m.—Discussion.
11.00 a.m.—The County Junior Farmer Association Programme—Richard Baycroft, Aurora, York County.
11.15 a.m.—Discussion.
11.20 a.m.—The Branch Junior Farmer Association Programme—Clarence Dennis, Brampton No. 6, Peel County.
11.35 a.m.—Discussion.
11.40 a.m.—Organization of Social Recreation—A. McLaren, B.S.A., 86 Adelaide St. E., National Council, Y.M.C.A., Toronto 2.
12.15 noon—Joint Luncheon with Junior Institute Delegates in College Cafeteria.
Chairman—Harry J. Laidlaw, Brampton No. 1, Peel County.
Address—J. B. Reynolds, President, O.A.C., Guelph.
1.45 p.m.—Massey Hall. Committee—Division into three groups, R. S. Duncan.
Committee No. 1, Chemistry Building. Chairman, Roy Thomson, Glanford Station, Wentworth County.
Subject: Programme—Zone, County and Branch.
Committee No. 2, Chemistry Building. Chairman, Alex. B. McKague, Teeswater, Bruce County.
Subject: Developing Leaders—Encouraging Non-participating Members—Attracting Possible Members.
Committee No. 3, Massey Hall. Chairman, Jas. Burnett, Elora No. 3, Wellington County.
Subject: Financing Junior Farmer Associations.
Committee No. 4. *Chairman to be appointed.*
Subject: Resolutions.
3.00 p.m.—Massey Hall. Chairman, Lloyd Snyder, Elmira, Waterloo County.
Presentation of Reports of Committees in above order.
4.15 p.m.—College Gymnasium. Demonstration, Social Recreation Programme by A. McLaren. Participated in by Junior Institute and Junior Farmer groups.

The Junior Institutes—The activities of the Junior Institutes are following closely with those of the Junior Farmers' organizations. At the conclusion of short courses, Junior Institutes are organized and these clubs actively participate

in community development. By combining and co-operating in programmes and social life, much enthusiasm is created and many projects are successfully completed. The representatives have co-operated with the Women's Institute Branch in organizing and carrying out various community and county programmes.

Champion Juniors' Trip to Chicago—The trip to Chicago was given as a championship prize to juniors in the various county competitions. In 1926, there were fifteen boys and nine girls attended the International Live Stock Exposition and Boys' and Girls' Club Congress held at Chicago. This year the group was in charge of E. I. McLoughry, Agricultural Representative for Waterloo County, and Miss E. Slicter, of Kitchener. The following is a list of those taking the trip.:

County	Name and Address	Donor of the Prize
Boys:		
Durham	Clarence Allin, Newcastle	Junior Farmers' Association.
Peel	Douglas Dunton, Brampton, No. 6	Junior Farmers' Association.
	Geo. Wilkinson, Cheltenham	" " "
Perth	Fred McKay, Jr., Stratford, No. 2	Perth County Council and Perth County Junior Farmers' Ass'n.
	Reuben Wettlaufer, New Hamburg	Perth County Council and Perth County Junior Farmers' Ass'n.
Simcoe S.	Gilbert Faris, Bradford	Municipal Bankers Corp., Ltd.
Victoria	J. Milton Fisher, Woodville	Local Funds.
Waterloo	Wm. Iutzi, Baden	J. M. Schneider Packing Co., Kitchener.
	Elmer Stoltz, Ayr, No. 1	J. M. Schneider Packing Co., Kitchener.
Wellington	Stanley Lawless, Palmerston	Wellington Junior Farm Boys, S.S. No. 7, Maryboro.
	Everett Oxby, Rothsay, No. 1	Wellington Junior Farm Boys, S.S. No. 7, Maryboro.
Wentworth	Grant Cranston, Glanford Station	Royal Bank of Canada.
	Osborne Sager, St. George	S.S. No. 5 Beverly, and School Fair Association.
York	Sandy Latimer, Sutton West	York County Council.
	Elton Armstrong, Armitage	" " "
Girls:		
Haldimand	Miss Elga Lint, Cayuga, No. 3	County Council.
Peel	Mrs. Ken. McIlwrick, Streetsville	Peel Junior Institute.
	Miss Marjorie Van Wyck, Caledon	" " "
Simcoe S.	Miss Genevieve Jamieson, Thornton	Women's Institute.
Wellington	Miss Katharine Cleghorn, Guelph, No. 7	Hon. H. Guthrie.
	Miss Margaret McNabb, Rockwood	Wellington Junior Farm Girls.
Wentworth	Miss L. Krick, Stoney Creek	Hamilton Spectator.
	Miss Gladys Goodbrand, Greensville	Junior Institute.
	Mrs. Alvin Weaver	School Section.

Eastern Ontario Junior Farmers' Field Day at Kemptville—The fourth annual field day was held at the Kemptville Agricultural School on June 16th. This event has become very popular with the young people of the eastern counties and this year between 3,000 and 3,500 attended. An interesting athletic programme was conducted and opportunity was afforded also of inspecting the crops and herds and of meeting members of the school staff. Carleton County was again successful in winning the trophy awarded annually for the highest number of points in sport events.

Junior Farmers' Plowing Competition—The home plowing competitions have been big factors in encouraging better plowing in the various counties. The weather was so bad during the past autumn that it was almost impossible to conduct successful competitions. The Department of Agriculture assisted in financing the prize money by giving grants not to exceed $25 per competition. The following is the list of competitions held in 1926:

County	Name of Organization Conducting Competition	No. of Competitors	*Amount of* Prize Money Paid	*Amount* of Grant Payable
Bruce	Teeswater, Walkerton, Port Elgin and Chesley	22	$128 00	$25 00
Carleton	Carleton Junior Farmers	10	15 00	7 50
Dufferin	Dufferin County Plowmen's Association	10	39 00	19 50
Grenville	Grenville Juniors' Competition	5	9 00	4 50
Halton	Halton Plowmen's Association	12	60 00	25 00
Hastings	Hastings Junior Farmers	12	50 00	25 00
Manitoulin	Manitoulin Plowing Competition	19	101 00	25 00
Middlesex	Komoka Plowmen's Association	28	268 00	25 00
Peterborough	Peterborough Junior Farmers Association	12	50 00	25 00
Prince Edward	Prince Edward Junior Farmers	11	67 50	25 00
Timiskaming	Junior Farmers' Association	9	52 85	25 00
Waterloo	Elmira Junior Farmers' Association	19	50 00	25 00
	Totals—12	169	$890 35	$256 50

PROFIT COMPETITIONS

These competitions are conducted for the purpose of encouraging junior farmers to keep cost records of various crops and from an analysis of these to determine the comparative value and cost of production of these crops. In addition to this the winners of these competitions are given a prize of a two weeks' short course at either Guelph or Kemptville. During 1926 competitions were conducted as follows:

	No. of Competitions	No. of Contestants
Acre Profit Competitions with Oats	10	42
" " " " Potatoes	4	23
" " " " Silage	2	6
" " " " Turnips	1	4
" " " " Barley	1	5
" " " " Wheat	2	10
Dairy Profit Competitions	4	14
Baby Beef "	8	29
Feeding Hogs "	7	26
Steer Feeding "	1	4
Poultry Profit "	1	5
Garden Club "	1	16
Total	42	184

Acre Profit Competitions

Prizes were awarded to competitors showing the highest net profit per acre. In order to have uniformity in calculating the cost of production and profit the following values were used:

1. Man and Horse Labour:
   Man labour to be reckoned at 25c. per hour.
   Horse " " " " 15c. " "
2. Fertilizer:
   Barnyard manure applied to this crop at $1.00 per ton or two-horse load.
   " " " to previous crop at 50c. per ton or two-horse load.
   Commercial fertilizer applied to this crop at two-thirds of cost price, additional commercial fertilizer applied to previous crop at one-third of this year's cost price.
3. Rent of Land:
   To be computed on the basis of eight per cent. of the selling value of the land, this to be figured by the Representative and the Junior Farmers' Associations.

Value Seed Used in Planting:		Value Product Harvested:	
Turnips	$0 80 per pound	$0 12 per bushel	
Mangels	45 " "	12 " "	
Potatoes	3 00 " bag	1 60 " bag (90 pounds)	
Spring Wheat	1 75 " bushel	1 25 " bushel	
Oats	95 " "	40 " "	
Barley	1 25 " "	65 " "	
Pea Beans (white)	2 25 " "	2 50 " "	(No. 1 Pickers)
Marrowfat Beans (yellow eye)	3 00 " "	2 50 " "	
Corn for Silage	1 75 " "	4 60 " ton	

The following table gives by counties the winners and the results of each:

County and Winner	Yield in Bushels per Acre	Value	Cost of Production	Profit
	Oats			
Elgin—Jack Ferguson, Belmont	59	$23 76	$21 57	$2 19
Glengarry—Roy McLeod, Dunvegan	49	19 60	15 11	4 49
Kent—C. W. Colby, Ridgetown, No. 1	55	22 00	21 26	74
Lennox and Addington—Roy A. Hartman, Odessa	50	20 00	13 84	6 16
Lambton—George Hardy, Sarnia	40	16 00	18 98	loss 2 98
Lincoln—Edward S. Parkham, Smithville, No. 1	60	24 00	18 60	5 40
Middlesex—Milton J. Campbell, Komoko	60.7	24 28	15 65	8 63
Andrew G. Grieve, Ilderton, No. 2	70	28 00	19 78	8 22
Rainy River—William J. Hamilton, Big Fork	69	27 60	17 55	10 05
Timiskaming—Herbert C. Edwards, Englehart	68	27 20	19 66	7 54
	Potatoes			
Rainy River—Maurice MacMillan, Emo	480	512 00	113 28	398 72
Thunder Bay (Fort William)—Gordon Blaikie, Flint	444	473 60	66 50	407 10
Wentworth—Noble Kirk, Freelton	290	307 40	84 75	222 65
Lloyd H. Small, Campbellville	275	291 50	73 17	218 33

Corn for Silage

	Tons			
Manitoulin—Archie A. Wickett, Meldrum Bay	15.9	73 14	27 15	45 99
Middlesex—Archie A. Campbell, Ilderton	33	151 80	24 05	127 75
	Turnips			
Bruce—Russel J. McKee, Tara, No. 5	1,600	192 00	53 88	138 12
	Barley			
Dufferin—Alvin C. Ferris, Shelburne	50	32 50	14 41	18 09
	Wheat			
Kent—Merton Simpson, Ridgetown	40	50 00	21 08	28 92
Renfrew—Charlie Sutton, Micksburg	26	32 50	15 18	17 32

Baby Beef

In this competition the contestants had an opportunity of exhibiting their stock at fairs and exhibitions where certain classes were open to these boys only. The basis of award was seventy-five points for quality and finish, twenty points for lowest cost per pound of gain and five points for best kept records. Feed consumed was valued as follows:

Ground Oats	$33 00 per ton		Low Grade Flour	$47 00 per ton	
Barley	36 00 " "		Tankage	64 00 " "	
Ground Peas	44 00 " "		Hay	12 00 " "	
Ground Rye	40 00 " "		Alfalfa	15 00 " "	
Ground Wheat	45 00 " "		Straw	6 00 " "	
Ground Corn	40 00 " "		Silage	4 50 " "	
Corn on Cob	65 per bus.		Turnips	4 75 " "	
Bran	31 00 " ton		Mangels	4 75 " "	
Shorts or Middlings	33 00 " "		New Milk	30 00 " "	
Oil Cake	53 00 " "		Skim Milk	4 50 " "	
Cotton Seed Meal	50 00 " "		Buttermilk	4 25 " "	
Gluten Feed	42 00 " "		Whey	2 00 " "	
			Green Feed (name kind)	2 50 " "	

County and Winner	Breed	Date of Birth	Weight of Steer	Value	Cost Feed Consumed and Initial Cost of Animal	Net Profit	Score
Bruce—							
Alphonse Schmidt, Mildmay	Shorthorn	Jan. 2, 1926	710	$69 22	$50 12	$19 10	86.0
Dufferin—							
Harold J. C. Torrance, Laurel	Hereford	Mar. 10, 1926	640	62 40	55 77	6 63	82.6
Middlesex—							
Ross McTaggart, Appin	Shorthorn	Oct. 12, 1925	1,050	102 38	62 46	39 92	93
A. C. Perry, Appin	Hereford	Jan. 6, 1926	700	68 25	65 48	2 77	77
Ontario—							
Geo. T. Samson, Uxbridge	Aberdeen Angus	Nov. 18, 1925	820	79 95	86 12	6 17	92
Peel—							
James A. Harper, Bolton	Shorthorn	Jan. 9, 1926	815	79 46	71 98	7 48	87.5
James Downey, Bolton	Hereford	Feb. 28, 1926	690	67 28	57 33	9 95	86.31
Will Rutherford, Bolton	Aberdeen Angus	Oct. 20, 1925	885	86 29	81 12	5 17	84.04

Steer Feeding Competition, 1926

County and Winner	Weight at Beginning of Feeding Period (2 steers)	Weight at Finish of Feeding Period (2 steers)	Gain in Weight (2 steers)	Cost of Feed	Cost of Feed per 100 lbs. Gain in Weight	Score
	Pounds	Pounds	Pounds			
Bruce—Wilbur H. McKague, Teeswater, No. 1	2,200	2,715	515	$71 77	$13 93	75.5

FEEDING HOGS FOR PROFIT COMPETITION, 1926

County and Winner	Length of Feeding Period	Average Weight of Hogs Alive when Marketed	Average Gain in Weight from Six Weeks of Age	Value per Hog of gain in Weight	Average cost of Feed per Hog	Average Net Profit per Hog	Average Net Profit per Cwt. Gain
Bruce—Lorne Evans Allenford	187	190	170	$21 84	$6 49	$15 35	$9 03
Durham—Mildred E. Sherwin, Orono	142	207½	177½	21 74	6 66	15 08	8 50
Lambton—Peter D. Forbes, Wyoming, No. 1	220	223	187	21 79	14 92	6 87	3 10
Middlesex—Clayton Trott, Mt. Brydges, No. 1	191	222	190	24 11	8 95	15 16	7 97
Ontario—Russell Heron, Seagrave	168	195	159	20 92	9 21	11 71	7 36
Rainy River—Wesley Barker, Devlin	178	230½	199	25 57	12 73	12 84	6 45
Simcoe N.—Will J. Elliott	224	250	228	26 82	11 33	15 49	6 79

DAIRY PROFIT COMPETITION, 1926

County and Winner	Value of Feed	Pounds Milk	Average Per Cent. Fat	Pounds Fat	Value	Pounds Skim Milk	Value Skim Milk	Net Profit
Lennox and Addington—Harvey Nelson Smith, Odessa	$34 68	13,151	3.5	396	$139 70	12,752	$29 30	$134 32
Lincoln—Lyall Merritt, Smithville	27 99	11,961	4	467 38	172 93	11,493.62	26 44	171 38
Middlesex—S. L. Shackelton, Mossley, No. 1	14 18	8,955	3.16	297.16	99 06	8,857.84	19 93	104 81
Wentworth—Roy G. Leeming, Glanford Station	39 40	13,936.2	3.5	495.2	170 99	13,441.0	30 90	163 49

Feed values for this competition were the same as those used for the baby beef competition.

Butter fat was valued as follows:

March	.48	August	.33
April	.37	September	.33
May	.34½	October	.33
June	.33½	November	.32
July	.33	Value skim milk at 23 cents a cwt.	

The prize was awarded in each case to the competitor showing the largest net profit.

County Stock Judging Competitions

During 1926 there were twenty-seven counties conducting county stock judging competitions. These contests were usually held previous to the inter-county events and thus provided good preliminary training. There was a total of 949 competitors or an average of thirty-five per contest. The following table gives details of the competitions by counties:

County	No. of Competitors	Prize Money
Bruce	57	Trophies.
Carleton	47	$90 00
Dundas	14	28 00
Durham	35	100 00
Elgin	45	40 00
Frontenac	40	49 75
Grey	90	Silver Cups.
Haldimand	19	Free trip to Royal and Guelph Winter Fairs.
Kent	64	$172 00
Leeds	18	60 00
Lennox and Addington	21	55 00 and five silver medals.
Manitoulin	16	$15 00
Middlesex	52	Cups and Medals.
Northumberland	3	
Ontario	34	$78 50
Peel	50	235 00
Perth	42	140 00 and trophies.
Peterborough	30	80 00 and two trips to Royal.
Rainy River	21	30 00 and cup.
Renfrew	21	65 00
N. Simcoe	9	40 00
S. Simcoe	61	135 00 and trophies.
Timiskaming	13	Cups.
Victoria	22	$81 75
Waterloo	50	177 50
Wentworth	45	98 00
York	50	174 00

Inter-County Judging Competitions

In 1926, inter-county live stock judging competitions were held as usual at the Royal, Guelph and Ottawa Winter Fairs. Teams of three Junior Farmers, under twenty-six years of age, were trained by the county representatives. At the Royal the competition was open to any county in Ontario; Guelph was open to counties west of and including Victoria and Durham, and the Ottawa contest was confined to counties east of this.

The winning teams this year were as follows:

Royal Winter Fair—York County.
Members of Team—Donald Petch, Newmarket.
Fraser Gee, Gormley.
Clarence Graham, Maple.
Coach—R. J. Rogers.

Guelph Winter Fair—Wellington County.
Members of Team—Earl Howse, Arriss, No. 1.
Howard Barbour, Hillsburg, No. 1.
Irwin Kopas, Elora, No. 3.
Coach—R. H. Clemens.

Ottawa Winter Fair—Carleton County.
Members of Team—Ernest Caldwell.
Wilson Gourlay.
Harold Nesbitt.

Following are the county standings and scores at the Royal, Guelph and Ottawa Fairs:

LIVE STOCK JUDGING COMPETITION, OTTAWA WINTER FAIR, NOVEMBER 24TH, 1926

COUNTY SUMMARY

County	Horses	Beef Cattle	Dairy Cattle	Sheep	Swine	Total	Standing
Carleton	470	519	452	466	416	2,323	1st
Renfrew	485	523	446	351	471	2,276	2nd
Dundas	507	531	406	455	362	2,261	3rd
Hastings	526	489	425	398	411	2,249	4th
Peterboro	491	538	415	339	430	2,213	5th
Lanark	484	446	385	383	428	2,126	6th
Leeds	474	424	423	344	435	2,100	7th
Grenville	411	454	479	313	405	2,062	8th
Lennox and Addington	440	469	412	298	419	2,038	9th
Glengarry	464	421	389	230	372	1,876	10th

INTER-COUNTY LIVE STOCK JUDGING COMPETITION

Held at Royal Winter Fair, November 11th, 1926

County Standing	Horses	Beef Cattle	Dairy Cattle	Sheep	Swine	Total
1 York	479	439	480	472	530	2,400
2 Carleton	428	427	548	453	486	2,342
3 Perth	436	520	477	413	486	2,332
4 Wellington	498	478	478	352	497	2,303
5 Oxford	437	432	510	420	473	2,272
6 Lanark	466	420	456	485	406	2,233
7 Wentworth	474	458	432	422	433	2,219
8 Bruce	460	403	475	392	464	2,194
9 Middlesex	467	416	445	448	410	2,186
10 Peel	489	424	410	374	471	2,168
11 Brant	418	377	443	418	474	2,130
12 Waterloo	442	391	447	414	427	2,121
13 Ontario	425	429	448	366	445	2,113
14 Dufferin (tie)	402	393	408	360	492	2,055
15 Simcoe South (tie)	477	349	469	402	358	2,055
16 Renfrew	450	372	420	458	351	2,051
17 Durham	461	362	397	417	386	2,022
18 Leeds	407	397	468	391	353	2,016
19 Haldimand	403	367	392	386	426	1,974
20 Grey	434	366	389	372	409	1,970
21 Lambton	420	427	354	306	424	1,931
22 Elgin	397	348	393	346	424	1,908
23 Lennox and Addington	422	378	343	365	389	1,897
24 Welland	409	356	375	349	404	1,893
25 Hastings	449	326	364	359	382	1,880
26 Essex	395	359	418	340	361	1,873
27 Dundas	394	342	382	328	386	1,832
28 Simcoe North	409	378	313	318	392	1,810
29 Lincoln	459	300	375	309	366	1,809
30 Huron	412	329	385	312	351	1,789
31 Grenville	378	241	361	311	358	1,649

INTER-COUNTY LIVE STOCK JUDGING COMPETITION

Held at Ontario Provincial Winter Fair, Guelph, November 29th, 1926

County Standing	Horses	Beef Cattle	Dairy Cattle	Sheep	Swine	Total
1. Wellington	402	512	470	488	540	2,412
2. Peel	472	461	465	453	511	2,362
3. York	364	456	473	542	459	2,294
4. Oxford	465	424	500	478	407	2,274
5. Wentworth	394	452	445	467	512	2,270
6. Dufferin	338	465	462	486	480	2,231
7. Haldimand	378	416	475	513	447	2,229
8. Durham	408	472	478	449	410	2,217
9. Middlesex	412	360	446	499	499	2,216
10. Grey	351	456	459	484	465	2,215
11. Victoria	397	469	482	453	395	2,196
12. Halton	437	442	468	491	356	2,194
13. Bruce	408	377	453	465	482	2,185
14. Perth	426	403	519	457	379	2,184
15. Waterloo	350	469	408	493	459	2,179
16. Huron	302	416	505	477	478	2,178
17. Simcoe North	379	408	458	493	419	2,157
18. Kent	407	367	429	474	453	2,130
19. Ontario	449	395	445	422	405	2,116
20. Lambton	392	424	464	479	356	2,115
21. Norfolk	323	395	444	490	430	2,082
22. Simcoe South	413	357	409	472	418	2,069
23. Lincoln	318	355	445	442	434	1,994
24. Elgin	313	345	448	419	275	1,800

PROVINCIAL CHAMPIONSHIP JUDGING COMPETITION

There was very keen rivalry in the eleventh competition between the teams of three boys winning in the east at the Ottawa Winter Fair and in the west at the Guelph Winter Fair, because Wellington and Carleton have each won three trophies in their respective districts and this was the second time teams from these counties had met in competition for the championship of the Province. Carelton County won by a margin of seventy-four points out of a possible 3,000, and this constitutes their second victory over Wellington County.

Excellent stock was provided by York County farmers as follows:

BEEF CATTLE:	Shorthorns	T. A. Russell, Weston.
	Finished Beef	Col. F. H. Deacon, Unionville.
DAIRY CATTLE:	Holsteins	Watson Brothers, Woodbridge.
	Jerseys	Baggs Brothers.
HORSES:	Draft	Dominion Transport, Toronto.
	Clydesdales	Don Alda Farm, Todmorden.
SHEEP:	Leicesters	Wm. Clarkson, Weston.
	Hampshire	L. E. Morgan, Milliken.
SWINE:	Tamworths	C. D. Boynton, Dollar.
	Yorkshire Sows	W. G. Rennie, Agincourt.

The judges were: Prof. W. J. Bell, of the Agricultural School, and Prof. Wade Toole, of the Agricultural College, Guelph.

The party were entertained at luncheon by Don Alda Farms, and at a dinner tendered by the donors of the trophy, the Union Stock Yards Company and the Ontario Packers, at which function the trophy was presented to the winning team by the general manager of the Union Stock Yards Company, who also presented each boy with a souvenir button of the event.

The following is a summary of the results:

	Horses	Beef	Dairy	Sheep	Swine	Total
Carleton.... Ernest Caldwell, Bell's Corners.....	153	155	183	152	182	825
Wilson Gourley, Carp.............	167	135	158	115	181	756
Harold Nesbitt, Britannia Bay.....	151	167	168	132	178	796
Coach: C. M. Meek, Agricultural Representative, Carp.						2,377
Wellington... Earl Howse, Ariss, No. 1..........	136	162	146	146	184	774
Howard Barbour, Hillsburg, No. 1..	116	170	102	165	174	727
Irwin Kopas, Elora, No. 3.........	139	173	152	175	163	802
Coach: R. H. Clemens, Agricultural Representative, Arthur.						2,303
Carleton..................................	471	457	509	399	541	2,377
Wellington..................................	391	505	400	486	521	2,303

Individual Judging Competitions at Exhibitions

At the larger exhibitions individual judging contests are held for Junior Farmers and Junior Institute members. These competitions are growing from year to year as the rural young people are taking a keener interest in them. The following table gives the number of contestants and the amount and division of prize money in the various classes at the shows:

Name and Date	Classes	No. of Prizes	Range of Prizes	Total Offered	Total Contestants
Canadian National Exhibition, September 8 and 9.	Heavy Horses..........	16	$20—$5 00	$200 00	56
	Beef Cattle............	16	20— 5 00	200 00	78
	Dairy Cattle...........	16	20— 5 00	200 00	91
	Sheep.................	16	20— 5 00	200 00	36
	Swine.................	16	20— 5 00	200 00	70
	Poultry...............	16	15— 50	120 50	19
	Grain and Roots.......	16	15— 50	120 50	57
	Fruit and Vegetables....	16	15— 50	120 50	22
Central Canada Exhibition, August 24.............	Heavy Horses..........	9	15— 7 00	99 00	30
	Beef Cattle............	9	15— 7 00	99 00	22
	Dairy Cattle...........	9	15— 7 00	99 00	54
	Sheep.................	9	15— 7 00	99 00	25
	Swine.................	9	15— 7 00	99 00	29
Western Fair, London, September 15..............	Heavy Horses..........	6	11— 3 00	40 00	18
	Beef Cattle............	6	11— 3 00	40 00	23
	Dairy Cattle...........	6	11— 3 00	40 00	23
	Sheep.................	6	11— 3 00	40 00	10
	Swine.................	6	11— 3 00	40 00	14
Peninsular Winter Fair, Chatham, December 7 and 8.................	Heavy Horses..........	7	7— 1 00	28 00	44
	Beef Cattle............	7	7— 1 00	28 00	44
	Sheep.................	7	7— 1 00	28 00	44
	Swine.................	7	7— 1 00	28 00	44
	Corn and Seed Judging.	7	7— 1 00	28 00	28
	Junior Corn Judging....	6	5— 1 00	13 00	23

Total prize money offered at fairs........................... $2,209 50

At the conclusion of the judging competitions on Wednesday, September 9th, 1926, at the Canadian National Exhibition, the Junior Farmers paraded under county banners, led by a bag-pipe band, from the Coliseum to the domestic

science judging hall where the Junior Institute girl judges joined the parade. The party of about 600 was led by officials of the Department of Agriculture and Directors of the Canadian National Exhibition in a parade around the grounds to a dining hall where all were guests of the Exhibition at a dinner. In the evening all the contestants and judges were entertained by the officials of the Canadian National Exhibition at the evening performance in a specially reserved section of the grand stand.

The Geo. Urban, Jr., Special of $100 was provided by Mr. Urban, a prominent citizen of Buffalo, and a strong admirer of the Canadian National Exhibition, for the encouragement of the boys' competitions. It was decided to award the money as part of the judging competition conducted by the Department of Agriculture. The sum of $10 was paid to each of the ten boys standing highest who had never previously attended the Canadian National Exhibition. This was of course in addition to the prizes awarded at the time by the Canadian National Exhibition. It was found that of a total of 429 boys who competed in the different classes, there were forty-eight who had never previously been at the Canadian National.

Girls' Household Science Judging Competition at the Canadian National Exhibition

The third annual Household Science Judging Competition for girls was held at the Canadian National Exhibition on September 9th, 1926. The Board of Directors donated a handsome trophy for the highest county team of three girls and also provided $440 prize money for individual competition. In the inter-county contest there were twenty-one teams entered and in the open competition 166 girls took part. In the counties the girls' teams were trained and coached by the staff of the Women's Institutes Branch co-operating with the county representatives. In most of the counties elimination contests were held and in this way many girls received excellent training. This year the winning team came from Haldimand County and the members of the team were as follows:

Elga Lint, R.R. No. 3, Cayuga.
Frances Fearman, R.R. No. 3, Caledonia.
Bessie Elder, Cayuga.

Month's Courses in Agriculture and Home Economics

Since 1912, this department has conducted short courses in agriculture and home economics. During 1926 there were 41 one-month courses in agriculture with a total enrollment of 1,362 students or an average of 24 pupils per course. There were 71 two-weeks' courses in home economics with a total enrollment of 2,816 girls or an average of 28 per course. In Northern Ontario there were 7 two-weeks' courses in agriculture with an enrollment of 310 pupils or an average of 38 per course. In home economics there were 5 courses with 146 students on the roll or an average attendance of 24 per course.

Courses in home economics included a study of foods, cooking, sewing, millinery and home nursing and first aid. These classes in home economics were conducted at the same time as the course in agriculture for boys. By running these classes concurrently it makes for increased attendance and promotes community development.

Three-Months' Courses in Agriculture and Home Economics

Three-months' schools were held in the following counties:

County	Where Held	Agriculture		Home Economics	
		No. on Roll	Average Attendance	No. on Roll	Average Attendance
Bruce	Lucknow	25	19	38	27
Haldimand	Caledonia	67	36	94	57
Hastings	Stirling	75	35	130	60
Huron	Fordwich	28	14	32	15
Lambton	Mandaumin	72	21	38	18
Wentworth	Stoney Creek	44	27	68	47
Wellington	Drayton	49	25	60	34
Totals for 7 Courses		360	177	460	258
Average per Course		51	25	65	37

These courses are very popular in some of the counties as they give the pupils an opportunity of making a more thorough study of the sciences taught. The local people arrange for halls, heating and other expenses in connection with the course and special lecturers for the course are provided by the department. In these courses more time is given to a study of such subjects as English and mathematics. These courses are a big factor in community development.

Sheep and Swine Marketing Courses

The Sheep and Swine Division of the Federal Department of Agriculture co-operated with the county representatives in organizing and conducting special sheep and swine marketing courses in conjunction with the regular short courses in each county. All these courses were very well attended and proved to be interesting and helpful to both old and young.

The Industrial and Development Council of Canadian Meat Packers, the Federal and Provincial Live Stock Branches, the Canadian Swine Breeders' Association and the county representatives conducted swine judging and marketing courses at the packing plants as follows:

Place	Date	Counties Included	Attendance
Toronto (East)	Dec. 9, 10, 11	Hastings, Prince Edward, Northumberland, Peterboro, Victoria, Durham, Ontario, York, Peel, Halton, Dufferin	79
Toronto (West)	Dec. 16, 17, 18	Grey, Wellington, Simcoe North, Simcoe South, Bruce, Huron, Haldimand, Welland, Lincoln, Wentworth, Muskoka and Parry Sound	64
Ingersoll, Ingersoll Packing Company's Plant	Dec. 16, 17, 18	Essex, Kent, Elgin, Lambton, Middlesex, Oxford, Brant, Norfolk, Perth, Waterloo	60
Peterborough, Canadian Packing Company's Plant	Jan. 20, 21, 22,	Renfrew, Carleton, Lanark, Leeds, Prescott and Russell, Glengarry, Dundas, Grenville, Frontenac, Lennox and Addington	31

The Annual Conference

The Nineteenth Annual Conference of Agricultural Representatives was held at the Ontario Agricultural College, Guelph, on July 5th-8th. This convention each year proves an interesting clearing house of ideas. It offers an opportunity for the men from fifty county offices to study methods which have been found successful and to present their more difficult problems for united consideration. The members were particularly inspired by addresses by Mr. A. B. Graham, in charge of co-operative extension work at Washington.

Zone Conferences

It has been found advisable to hold district meetings of agricultural representatives to discuss particular zone problems and conferences of this kind were held as follows: Kemptville, October 5th; Hamilton, October 11th; Arthur, October 13th; Ridgetown, October 15th; Port Hope, October 18th; Chatham (Special Tobacco), March 31st; London (Special Corn Borer), January 3rd, October 9th. In addition, numerous committee meetings were held dealing with special problems and phases of the work.

HOME DEMONSTRATION WORK, PEEL COUNTY

The people of Peel County have increased their demands upon the services of the home demonstrator as indicated by the following comparison which shows an increase in every item:

	1925	1926
Office Callers	695	977
Telephone Calls (Incoming)	1,100	1,200
Letters Received (Approximate)	957	1,300
Letters Sent	930	983
Circular Letters Sent	753	1,952
Bulletins Given Out	580	1,084
Meetings Addressed	96	127
Attendance	4,953	5,172
Special Short Courses	4	13
Schools Visited	7	10
Rural Homes Visited	96	156
Newspaper Articles	8	11
New Organizations Formed	1	6
Half Days in Office	269	284
Miles Travelled by Car	4,000	6,123

Short Courses

A five-weeks' course in home economics at Caledon East was attended by a total of 110 girls and young women with an average daily attendance of sixty-five. Special nutrition schools were held as follows, instruction being given by the home demonstrator:

Place	Auspices	Dates	Registration	Average Attendance
Brampton	Junior Institute	Mar. 8-11	15	11
Brampton	C.G.I.T	Mar. 1-Apr. 26	15	14
Caledon	Junior Institute	Apr. 20-22	13	10
Cheltenham	Junior Institute	Apr. 25-28	8	8
Caledon	Women's Institute	June 10-Nov. 3	30	27
Dixie	Women's Institute	Oct. 12	32	32
Mono Road	Women's Institute	July 16-Dec. 3	36	32
Sandhill	Women's Institute	July 15-Dec. 9	22	19

OTHER SHORT COURSES

Place	Date	Course	Instructor	Registration	Average Attendance
Brampton	Nov. 24-26	Basketry	Miss Sloan	6	6
Port Credit	Nov.-Dec.	Nursing	Dr. Thompson	12	12
Streetsville	February	Basketry	Mrs. Bruce	10	10
Streetsville	March	Basketry	Mrs. Bruce	10	9
Streetsville	Nov.-March	Manual Training	Mr. Sissons	50	45

SENIOR WOMEN'S INSTITUTES

After serving eight years as district secretary of the Peel Women's Institutes, the home demonstrator resigned in June in order to devote more time to the requests of other organizations and give more attention to other phases of work. During the period of this secretaryship the Peel Women's Institutes have made remarkable progress as may be seen by a comparison of statistics for the year 1917-18 with 1925-26:

	Regular Meetings	Special Patriotic Meetings	Total Attendance	Papers and Addresses	Members	Receipts
1925-26	232	0	6,236	286	969	$3,722 87
1917-18	129	68	3,046	114	471	3,052 72
Increase	103	..	3,190	172	498	$670 15

This advance has been attained in spite of the fact that in 1917-18 patriotic zeal was at high tension and that since that time active Junior Institutes have been organized in many parts of the county.

JUNIOR INSTITUTES

The following table will suggest the strength of these organizations:

Group	Membership	Meetings	Attendance	Receipts	Expenditures
County	(all branches affiliated)	3 4 (exec.)	215 45	$293 00	$273 99
Brampton	41	16	420	427 96	346 64
Bolton	29	7	396	72 46	27 99
Caledon	15	6	170	159 16	140 42
Cheltenham	15	14	220	46 83	11 45
Caledon East	111	4	256	34 88	17 01
Clarkson	20	5	100	62 80	44 02
Codix	20	4	60	12 69	12 69
Streetsville	23	9	156	105 92	88 58
Tullamore	50	4	90	12 50	......
Total	324	76	2,128	$1,228 20	$962 79

Some idea of the work undertaken by branch units is suggested by a summary of the activities of one unit:

Brampton—Adopted two little girls for clothing, education and health supervision; each needy family at Christmas supplied with bread, milk and meat tickets and baskets of apples; lamps for Peel Memorial Hospital; gifts to the Victorian Order Nurse for her work; play (given eight times in county by this group); courses in basketry and nutrition; public speaking; debating; athletics; canning demonstration; members in garden and poultry clubs; school fair prizes and booth; gifts to Children's Shelter; booth at school fair.

A girls' garden club proved an interesting new feature which was introduced this year as a means of encouraging better kitchen gardens and a wider use of fresh and home-canned vegetables, as well as providing a useful project for members. Eighteen kinds of vegetables of the most approved varieties were chosen and a choice was allowed between hand and horse cultivation. Each contestant was supplied with a pamphlet of suggestions on planting, cultivation and canning and each agreed to exhibit at a local fair. Prizes were awarded on a basis of 80 per cent. for garden and 20 per cent. for exhibit of canned vegetables from it.

"Twenty-six gardens were judged in July; one received a score of 99.0 per cent., and the average was high. Every member was interested. New or previously little known vegetables were added to the menus partially as a result of our study of nutrition at the special three-day courses held during the late winter and early spring. A canning demonstration attended by thirty-two girls was given on July 13th. Much home canning was done and excellent exhibits made at fall fairs both in the special and open classes. One girl sold $6 of fresh vegetables from her garden. One member gave an address at the Central Ontario Women's Institute Convention on the Garden Club and another a similar one at the Junior Institute Conference at Guelph."

KEMPTVILLE AGRICULTURAL SCHOOL

The Kemptville Agricultural School has had another successful year. The attendance of students, the interest in our farming practices by the farmers of Eastern Ontario, and the yields from our fields, orchard, live stock, poultry and apiary departments, have all been a source of satisfaction.

The attendance in the regular classes, was as follows:

Agriculture	43 students
Domestic Science	16 "

The short courses and attendances were as follows:

Agriculture	33 students
Teachers' Summer Course in Agriculture	54 "

The school was again the centre for conferences and conventions, the following having been entertained during the past year:

	Number in Attendance
Boys' and Girls' 3-day Conference (co-operating with Women's Institute and Agricultural Representative Branch)	135
Junior Farmers' Field Day	4,000
Eastern Ontario Rural Trustees' and Ratepayers' Association	125
Eastern Ontario Dairy Instructors and Dairymen's Association	110
Grenville County Teachers' Convention	114
Eastern Ontario Bankers' Conference	95
Ottawa Branch, Ontario Vegetable Growers' Association	50
Canadian Society of Technical Agriculturists	90
Eastern Ontario Alumni Association of Queen's University	28
District Meeting of Women's Institute	80
Agricultural Representatives' Conference for Grenville County	65
Ramsayville Presbyterian Church Picnic	35
Inspection Silo Filling with Sweet Clover	45
Ex-students' Annual Re-union	110

In addition to the above, frequent visits were made by small automobile parties of farmers who were shown the different farm departments by the school staff. In all, approximately, sixty-five hundred people visited the institution during the past year.

During the past year, three houses, recently purchased and renovated, were occupied by members of the staff. One more house is necessary for this purpose. As every room in the boys' residence is now occupied, it will be necessary to increase the accommodation for agricultural students at an early date.

Live Stock

The dairy herds on the farm are in a healthy condition, again having passed a clean Federal tubercular test. All young stock are thrifty and contain some promising individuals both in the Holstein and Ayrshire herds. No additions have been made by purchase during the past year. All young bulls found a ready sale. Several females are running in R.O.P. test, and will have creditable yearly records.

The addition to our hog pen will greatly assist in supplying the increased demand for breeding Yorkshires. Revenue from the hog department for the year was one thousand, three hundred and eighty-three dollars and thirty-five cents ($1,383.35). During the past year, the following were sold at breeding age for breeding purposes: hogs, 5; sows (bred), 17.

During the past winter, two of our litters became very unthrifty shortly after weaning. They were dry in the hair, and had rough and scabby skins. To attempt to improve their condition, fifteen unthrifty pigs were fed cod liver oil. To start the experiment, one teaspoonful per pig, per day, was fed, gradually increasing until each was receiving a tablespoonful per day. In all, five gallons of oil were fed. At the end of the experiment, the pigs were thrifty and clean skinned.

Realizing that the improved condition of the hogs may have been caused, to some extent, by other means, the experiment is being repeated this winter with a similar class of young pigs, with a view to securing more information. It appeared, however, that cod liver oil had considerable value in increasing the thrift in young pigs.

Shropshires did well last year, the crop and quality of lambs being superior to former years. A shearling ram purchased last fall improved the fleece, considerably, of our lambs—compared with those of any previous year.

Poultry

The poultry plant, at the present time, has housing room for about five hundred hens, and colony-house capacity for two thousand growing chickens. Four hundred and twenty birds completed a year's work under trap-nests. Of these, two-fifths were old hens, and the remainder pullets. The egg records were very good, 42 per cent. of the pullets passing the 200-egg mark. The highest plant record was made by a Barred Rock pullet, which succeeded in producing 287 eggs in 365 days. The average production of the entire plant reached the pleasing total of 168 eggs per bird.

Cockerels to the number of 188 were supplied to farmers at a nominal price. Of these, 133 were sent to breeding stations, and the remaining 55 went to other farmers. Some 200 pullets and 100 yearling hens were sold to farmers as foundation stock. These birds were sold at cost, for the purpose of stock improvement.

Extension work was carried on from time to time as opportunity was presented. This work is handicapped owing to lack of time and press of work on the home department. A number of eggs were supplied for hatching purposes, but the demand far exceeded the supply. There is a keen demand for hatching eggs and breeding stock which cannot be met from a plant of this size.

Apiary

The winter of 1925-26 was one of the worst that beekeepers experienced in this locality for many years. Many beekeepers reported heavy winter losses. Winter set in earlier than usual, and bees were confined to their hives until quite late in the spring. Owing to so much cold wet weather during the dandelion and fruit bloom, little nectar was gathered from these sources.

In the fall of 1925, twenty-seven colonies of bees were put into winter quarters at the school. Two of these colonies died from long confinement, and three others were so weakened that they were united. All other colonies came through in good condition. This gave a spring count of twenty-three colonies of Italian bees. During the past summer this number was increased 74 per cent., making forty colonies in the fall.

Although production was greatly handicapped by bad weather and the making of increase, yet two thousand, six hundred and eighty (2,680) pounds of extracted honey and eighty-one (81) pounds of comb honey were harvested, making an average of one hundred and twenty (120) pounds per colony, spring count.

Outdoor wintering in quadruple cases is practised. Standard ten-frame Langstroth hives are used.

This department has a reversible four-frame extractor and other necessary equipment for successfully demonstrating modern beekeeping practices to the students. Owing to the large number of black and hybrid bees in the vicinity, queen rearing has not been practised.

Horticulture

Further progress has been made in developing the horticultural department of the school during the past year. The past season was a difficult one in which to grow the variety of crops required, with the limited facilities available. Under average conditions, these difficulties would not have been so pronounced. A late spring necessitated keeping a quantity of material in the small greenhouse for several weeks longer than usual; the weather was too severe to permit the use of a number of frames generally filled at this season with garden material. Further damage was caused by several unusually severe late frosts. This injury was experienced by many growers of early garden crops in the district. Considerably more than half the cabbage and cauliflower plants that had been transplanted from cold frames to the garden early in June were killed by a frost. Beet and carrot seed sown about the middle of May proved a total loss, and had to be resown in June. Despite these setbacks, a quantity of material was grown and stored for the needs of the school dining-room during the summer and winter courses. Approximately one thousand (1,000) tins of sweet corn and tomatoes were canned in the small "home-canning" plant installed two years previously. Early frosts in September brought to a close one of the shortest growing seasons experienced in this district for many years.

This disheartening experience of many of the smaller market garden growers, has emphasized the necessity of providing more adequate means for the growing of market garden crops under possible adverse conditions. It has resulted in increased activity in building greenhouses, pits and frames, with a consequent permanent benefit to the market-garden business.

The area available for growing garden crops had become congested, due to the increased planting of small fruits. This difficulty has been overcome during the past season by the acquisition of a suitable area of approximately two acres, that will now permit the culture of several crops on soil more suited to their needs.

The school orchard, consisting of more than twelve hundred young trees, came through the winter in good condition. Sweet clover had been sown the previous August as a cover crop. It made considerable growth before winter set in, and, owing to conditions experienced in the spring, it had grown to a height of eight to ten inches before it was possible to plough it down. This method of culture produced considerable vigour and growth in the trees, but might prove disastrous if repeated the following year. One of the main objects, if not the chief factor, to be obtained in growing a young orchard in Eastern Ontario is that of maturing the season's growth before severely cold weather is

experienced. If the young trees are grown in sod, maturity of growth occurs naturally, but often at the expense of the size of the trees; the difficulty, therefore, arises in practicing a method of culture that will produce reasonable growth with the desired maturity.

The crop consisted almost entirely of the early varieties, Duchess and Wealthy. There were no McIntosh or Fameuse, and only half the Milwaukee obtained the year previous. The Wealthy, however, were so heavily laden that a considerable proportion of the crop was removed in July. The quality was most satisfactory, and this result was largely due to the purchase of a small type of power sprayer that gave entire satisfaction throughout the season. By the use of this small power sprayer, the time required to spray the orchard was less than half that formerly needed when the work was done by means of a hand pump; the work, moreover, was done more thoroughly, and with considerable saving of material.

During the summer season, several horticultural societies visited the institution, amongst them the Ottawa Vegetable Growers' Association, and favourable comments were made by a number of those visiting on each occasion, with suggestions for future work, that were appreciated.

A number of meetings were attended during the year, and lectures were given on horticultural subjects in general. Assistance was rendered in the planning and planting of several farm homes, and it is earnestly hoped that in the near future assistance may be available to materially extend this very important phase of agricultural community and home development.

In a previous report of this department, it was stated that a considerable amount of grading and filling had yet to be done around several of the school buildings; the heaviest portion of this work has been completed, though a certain amount of sodding has yet to be done on the slopes and terraces around the main building. The trees and shrubbery around the grounds have made satisfactory growth, and a collection of this material is gradually being added to from year to year.

Field Husbandry

Crops on the Kemptville Agricultural School Farm in 1926 were generally satisfactory, and, for the most part, were harvested in good condition. Substantiation was again given to previous findings in three important respects, viz., that barley is a safer and more profitable crop to grow as a source of grain for hogs and cattle than oats; that alfalfa of the proper strain can withstand the Eastern Ontario climate and provide good yields of cheap and nutritious roughage; and that sweet clover as a source of pasture and silage has no equal in Eastern Ontario. It is gratifying to note that these facts are becoming more clearly recognized by the farmers in this portion of the Province, and noticeable increases in the above crops have taken place.

The modified three-year rotation, as practiced on the farm, is also showing results in the direction of greater fertility in the land and in the control of weeds. Relative to the building up of fertility, the yields of hay and grain for 1926 are as follows:

Alfalfa Hay (established fields)	3.07	tons per acre.
Barley	48	bushels per acre.
Banner Oats	77	" "

These yields, while not exceptionally high, are certainly better than could be secured early in the history of the farm, and indicate that the land is becoming more fertile.

Relative to weed control on the farm, the fact that we are able, with comparative ease, to produce grain of sufficient cleanliness and purity to be eligible for registration, suggests that this difficult problem is being met satisfactorily.

Yields of other crops were also satisfactory, with the exception of turnips which were badly damaged by the green aphis. Sweet clover silage yielded slightly over nine and one-half tons per acre, and was produced for less than two dollars ($2) per ton.

Fertilizer tests in co-operation with agricultural representatives were conducted in Leeds and Renfrew Counties respectively, and, in most cases, emphasized the need for phosphates.

The seed-cleaning plant continues to be patronized by farmers in the area surrounding Kemptville, being teamed or shipped in frequently from fifty mile radius. Following is a summary of the work accomplished:

Sweet Clover Scarified and Graded	61½ tons.
Timothy and Clover other than Sweet Clover	1,843 bushels.
Cereals	5,704 "
Number of farmers making use of plant	290

The need for greater space is acute, and it is felt that an up-to-date, conveniently-arranged plant would serve as a demonstration for other centres in this important work.

A considerable amount of time was spent in assisting with the Better Seed Train; serving as director of the Ottawa Winter Fair in charge of the Seed Department, and as director of the Canadian Seed Growers' Association, as well as aiding agricultural representatives whenever called upon.

AGRICULTURAL DEVELOPMENT BOARD

During the past year there has been a further increase in the work of this Board in loaning money to farmers on first mortgages, as the following comparative statement will show:

	Number of Applications Passed	Amount of Loans Passed	Value of Security	Number of Loans Paid Out	Amount Paid Out
1922	458	$2,040,605 00	$4,693,304 00	334	$1,188,000 00
1923	953	3,729,350 00	8,685,166 00	776	3,000,000 00
1924	990	3,582,150 00	7,871,026 25	819	3,200,000 00
1925	892	3,246,680 00	7,197,300 00	701	2,700,000 00
1926	1,119	4,028,300 00	9,089,008 57	831	3,200,000 00
	4,412	$16,627,085 00	$37,535,804 82	3,461	$13,288,000 00

No doubt this increase was partially due to the action of the Government in reducing the rate of interest during the previous year from 6½ per cent. to 5½ per cent.

The experience of the past year in the matter of repayments has also been satisfactory. The following table gives the situation in this regard:

Due Date	Amount Due	Amount Uncollected	Percentage Uncollected
December 1st, 1924	$286,174 11	$4,554 85	1.59%
May 31st, 1925	278,982 77	3,700 43	1.33%
December 1st, 1925	380,075 20	23,729 97	6.24%
May 31st, 1926	362,425 18	54,347 22	14.81%

It will be noticed that the large amount outstanding has been due for less than six months. For all outstanding amounts there is apparently good security.

During the year through process of law, twenty-one farms came into the possession of the Board. With the four on hand at the beginning of the fiscal year this made a total of twenty-five. At the end of the fiscal year all these properties had been sold except three. No losses were incurred on the sales. This record is even slightly better than the record of the previous year.

In regard to Short Term Loans, the existing associations carried on business during the year, but no new associations were formed. Repayments were made to the extent of $48,517.39 and new loans granted to the extent of $24,713.10. This leaves a total amount outstanding of $175,940.08. While this amount of capital is outstanding the payments of interest have been well kept up, the arrears amounting only to $802.59.

Since its inception the Board has been turning over to the Treasury Department each year the revenues received from inspection and legal fees. The revenue from the 1 per cent. interest accruing to the Board has, however, been allowed to accumulate owing to the system of financing. During the past year the Board paid over to the treasurer a cheque for $100,000 from this fund. There still remains a surplus amount of $179,832.22. This includes an operating surplus of $57,032.90, which was shown on the operations for the past year.

WESTERN ONTARIO EXPERIMENTAL FARM

The season of 1926 was most peculiar; the growing season, proper, was very dry and most of the harvest season was extremely wet. The rainfall throughout the growing season came in many small showers with the consequent loss through evaporation.

Rainfall by months:

April	3.14 inches	—8 showers
May	.91 "	—5 "
June	2.15 "	—9 "
July	.77 "	—4 "
August	5.97 "	
September	8.85 "	
October	4.15 "	

Seed Supply

The farm has become definitely established as a centre for the distribution of high-grade seed wheat, oats, barley and beans. All beans grown are sold for seed purposes only and the demand is so insistent that arrangements have been made whereby for two seasons beans grown by neighbours from seed secured from the farm have been disposed of. The strain distributed has proved itself superior in yielding qualities, requiring a season of only four to five days longer to mature than many of the old strains. This past season, owing to a heavier vine, they have withstood the wet weather exceptionally well and better than other beans.

The demand for seed oats and barley is very great. The demand for seed wheat is on the increase. All wheat raised is sold for seed and many inquiries have to be directed to growers located nearby where farms are reasonably clean and the varieties satisfactory.

The Soy Beans can annually be sold for seed. Four acres only are grown.

The farm has not encouraged the growing of Soy Beans except for hay purposes. The danger of the beans becoming part of the hog ration is altogether too probable and the damage will be almost irreparable except over a long period of time.

We are far better able to do without the Soy Bean than we are to face a quality problem in our pork.

Live Stock

The health of the stock could not be better. There has been no disease among the swine or poultry during the year.

The trouble at farrowing time experienced throughout the Province resulted in a very low average in the spring litters. Some difficulty was prevalent during the fall, and three Yorks sows were disposed of and replaced by young ones.

The handling of three breeds of pure-bred swine on a small institution is difficult and, if all are kept up to standard, is costly.

The demand for breeding stock is very satisfactory—the supply is much too small for the demand.

Under the particular conditions in southwestern Ontario, it would be advisable to cater more to demands for breeding stock in swine so that a greater influence could be exerted over the type of hogs kept.

The low set, fine bone, chunky hog is gradually disappearing but the process is slow; the distribution of rangier sows and boars conforming more nearly to the proper bacon type would be of great assistance and would be acceptable to the people generally.

The cost of production is the greatest problem with many. Some work will be commenced in the spring of 1927 to further counteract the all too prevalent idea that the old type of a thick smooth is the cheaper producer.

Permanent Improvements

The greenhouse, 100 feet by 30 feet, was completed during the year. A partition has been added in order to permit the production of a commercial crop in addition to flowers, etc.

The crops growing are tomatoes, lettuce, radishes, spinach and flowers.

The students from the Agricultural School use the house for practical work.

Visitors are frequent to the greenhouse and include both professional and amateur growers interested in flowers and vegetables growing under glass.

Vegetable Gardening

A garden site was selected and laid out in two equal and similar divisions, each containing one acre, with suitable roadways provided. This garden was used during the 1926 season for the growing of experimental and commercial vegetable crops.

It is planned to work out a long-time demonstration on the maintenance of soil fertility in vegetable-growing lands. The two sections of the garden will be used, the one acre receiving barnyard manure in its treatment while the other acre depends alone upon green maturing crops and commercial fertilizer applications for its supply of added plant food.

Fruit Growing

A—*Apples*—Realizing the need for the testing and demonstrating of some of the newer and more promising varieties of apples suited to southern Ontario conditions, a variety apple orchard was set out in the spring of the past season. This orchard will also prove of great value in connection with the courses in horticulture taught at the Vocational Agricultural School.

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The following varieties an[...] [...]sed. The orchard is set out on the hexagonal pl[...] [...] each tree.

Row	No. of Trees	Name	Remarks
1	10	Red Spy	From Geneva Experimental Station
2	9	Astrachan	" " "
3	10	Red Gravenstein	" " "
4	9	Jonathan	
5	10	*Golden Delicious*	
6	9	Melba	Seedling produced at C.E. Farm, Ottawa.
7	10	Starking	
8	9	Crimson Beauty	
9	10	Rome Beauty	
10	9	Early McIntosh	From Geneva Experimental Station.
11	10	Stayman Winesap	
12	9	Lobo	Seedling produced at C.E. Farm, Ottawa.
13	10	Spitzenburg	
14	9	Joyce	Seedling produced at C.E. Farm, Ottawa.
15	10	Milton	From Geneva (?).
16	9	Niobe	Seedling produced at C.E. Farm, Ottawa.
17	10	Laufam	Seeding produced at C.E. Farm, Ottawa.
18	9	Tolman	

NOTE.—Despite an adverse season the trees made a good start and show good growth. Some few replacements will be necessary, however, due to accidental and pest damage done the trees.

B—*Small Fruits:*

Raspberries—Stock of the following varieties was secured in a small quantity of each and from a reliable disease-free, government-inspected nursery.

Cuthbert—Herbert—Brighton—Count

A further planting of 500 suckers was made of Viking, the promising new variety produced at the H.E.S., Vineland. This latter stock on increasing, and if judged suitable for the district, will be distributed amongst good growers.

The stand of plants resulting from the Cuthbert, Herbert, Brighton and Count varieties planted was poor, owing to the bad condition in which the plants arrived and the hot dry weather following planting.

Strawberries—A small nursery was started, using the following varieties of strawberries:

Cassandra—Portia—Glen Mary—Senator Dunlop—Premier
and Parsons Beauty

It is planned to establish beds of these varieties suitable for demonstration purposes and for use in conjunction with the school courses in horticulture.

NUT CULTURE

Walnuts of the varieties known as Chinese and Carpathian were planted and a considerable number of young trees are now growing in the nursery plot. It is planned to use these trees for propagation purposes in producing and in trying out various kinds of walnuts considered possible for growing in southern Ontario.

Ornamental Plantings and Developments

Rose Beds—Two new rose beds were set out this year and the following varieties were added to those previously planted:

America	Lady Pirrie	Columbia
Col. Fitzgerald	Hoosier Beauty	Glory of Steinfurth
Los Angeles	Mrs. H. Morse	Mrs. W. C. Miller
Louise Crette	Prince of Wales	K. of K.
Madame Butterfly	Earl Haig	Ophelia
Geo. C. Ward	Souvenir de Claudius Pernet	Madame Jules Bouche
F. L. Izzard		Golden Emblem
F. W. Dunlop	Elsie Becwith	Hugh Dickson
The General	Betty	J. B. Clark

Lawns—One new lawn was laid down this season and the land drained, piped and graded for the planting of another section next season. General improvement work was undertaken as opportunity permitted in grading and improving the grounds surrounding the farm buildings.

Extension Work

Agricultural meetings and courses were attended whenever necessary.

A large number of committee meetings were attended in connection with seed, live stock, agricultural representatives, corn borer and agricultural school activities.

The Corn Borer

Undoubtedly, the Corn Borer is here to remain indefinitely. The area of real damage is rapidly extending. Methods of combat will necessarily be severe. Intelligent production may be a possibility—the use of catch crops, various dates of planting and varieties of corn all have to be carefully considered before it can be admitted that we have to abandon the corn crop.

Every assistance possible is being offered to the authorities in the clean-up campaign.

Agricultural School

The school commenced in 1925 was finally completed in November, 1926. The experiment in agricultural education shows very definite indications of being particularly successful.

Considerable time was given to assist the Vocational and High School Boards in this work.

The selection of the principal became a real problem; first, to locate a suitable man and, second, to find the money to pay such a man. However, both difficulties were overcome and Norman Davies, B.A., was engaged. Mr. Davies had taken the teacher's courses at Guelph and taught agriculture at summer schools, and was an enthusiast in agricultural teaching. Oliver Cameron, B.S.A., was selected as regular agricultural teacher, and the balance of the work is taken by F. W. Presant, B.S.A.

A class of twenty-two are in regular attendance taking an agricultural course which is outlined and will take three or four years to cover.

The community hall is filling a real need around the school.

The whole-hearted, unanimous, and in some cases the enthusiastic support given by the people to the entire undertaking is one of the most gratifying and most promising features pointing to a successful conclusion of the venture.

Mr. Presant, of the farm staff, is undertaking the instructional work in vegetable growing, floriculture and landscape gardening in the Agricultural School.

The Peninsular Winter Fair

The third Winter Fair was a success. An effort was made to secure new quarters but without immediate results. The original idea was to ascertain if the people really wanted a fair in this part of the Province; their attendance at three successive shows held under most unfavourable conditions was ample proof. Failing new quarters, the Board decided to put on another show in December, 1926, and unless public opinion was sufficiently strong to influence the various councils and governments that permanent quarters were necessary, the show was to be abandoned.

Plant Disease Work in the Ridgetown District, 1926

The early part of the summer was very dry and very few diseases developed in the early crops. The latter part of the summer, however, was very wet and diseases became more troublesome especially in such crops as celery and late potatoes. A number of experiments for the control of plant diseases were carried on, some on the Experimental Farm and others in different places in Essex and Kent Counties.

Stinking Smut (bunt) of Wheat has become very troublesome in this district during the past few years, so in September, 1925, six different substances were used in treating wheat that was badly affected with smut. Some of these substances were used as dust and some in solution. The treated grain was then sown in plots, in duplicate, each 1/100 acre, and a seventh plot was sown as a check, no treatment given to the wheat. In two of the plots there was no smut, in two there was only a trace, in one there was 1.5 per cent., whereas in the check plot there was 9.2 per cent. smut.

An experiment for the control of oat smut much similar to that of 1925 was carried on. Oats were treated with ten different substances, some as dust and some in solution. The treated oats were sown in plots each 1/100 acre, in duplicate. In the plots where the oats were given the formalin spray (dry Formaldehyde treatment) there was only a slight trace of smut. In the other plots the amount of smut ranged from 3.1 per cent. to 8.5 per cent. and in the check plots (no treatment) there was 10.8 per cent. smut.

The work in beans for the control of anthracnose and mosaic was continued. The seed sown was from 1925 crop which had been rouged for mosaic during the growing season and hand picked for anthracnose after harvesting. Four different strains of seed were sown and in all cases the amount of mosaic and anthracnose was less than during the previous year, but owing to the unfavourable season for the bean crop and the damage done during the early part of the season by the seed corn maggot, results cannot be compared with other years.

During unfavourable seasons celery blight causes a great loss in the crops. Two experiments were started for the purpose of comparing dusting with liquid Bordeaux as a means of control. One of these experiments was on the Experimental Farm and the other with one of the celery growers in the district. The weather was very dry and after a number of applications, spraying and dusting were discontinued as there was no appearance of blight either on the sprayed or unsprayed rows. At a later time, however, blight developed very badly in one of the plots and if spraying had been continued some definite results might have been obtained.

Experiments for the control of onion smut were continued in the Pelee onion marshes, three substances being used, viz.: kalimat, semesan and formalin. These substances were used at different strengths except semesan which was used at the rate of one ounce to five gallons water and 100 gallons of solution per acre, giving a yield of 450 bushels per acre. Similar quantities of formalin and kalimat were used at different strengths to see which would give the best results and in all cases formalin gave a higher yield than kalimat. The highest yield was obtained where formalin was used at the rate of one pint to fifteen gallons of water and 150 gallons per acre, the yield being 505 bushels per acre. Whereas in the rows where no treatment was given the average yield was eighty-five bushels per acre.

During the summer an inspection was made of several raspberry plantations in the Counties of Essex, Kent and Lambton for the purpose of ascertaining where raspberry stock could be obtained that would be practically free from such diseases as mosaic and leaf curl. Only one plantation was located that was suitable for this purpose, and this one should be a good source of supply for raspberry stock. The owner's name has been added to the list of those growing certified stock in Ontario.

SEASONAL WORK WITH VEGETABLE CROPS COMPLETED FOR SEASON 1926

Crops—Tomatoes

Project—To determine the relative returns from different dates of planting tomato seed for an early crop.

Early Tomatoes

Plot No. and Date of Planting	Yield per Acre July 14 to 28		Yield per Acre July 29 to Aug. 11		Yield per Acre Aug. 12 to 20		Total Yield per Acre	
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
Plot 1, February 27th	2,737	8	13,125	0	13,075	0	28,937	8
Plot 2, March 6th	3,362	8	13,025	0	12,225	0	28,612	8
Plot 3, March 13th	2,524	8	8,289	0	9,490	8	20,304	0
Plot 4, March 26th	3,250	0	8,600	0	5,437	8	17,287	8

Plot 1. Plants were of necessity checked to such an extent that the first blossom cluster, which was set in the greenhouse, did not produce much fruit.

The earliest fruit in the field was picked from plot 1, but the first fruit was light in yield and of indifferent quality.

Project—To compare and test the commercial value of several varieties, many of which were new introductions, extensively advertised.

EARLY TOMATOES

Variety	Yield per acre July 19-26		Yield per acre July 27-Aug. 3		Yield per acre Aug. 4-11		Total yield per acre		Recommended for early use
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	
Earliana (Moore)	1,093	12	2,187	8	1,062	8	4,343	12	
First Early (Tait)	1,106	4	1,825	0	1,375	0	4,306	4	
Earliana (Mich. S.C.)	1,050	0	1,900	0	900	0	3,850	0	
Starr	1,381	4	1,200	0	1,162	8	3,743	12	
Penn. State Earliana (Stokes)	862	8	1,600	0	937	8	3,400	0	
Earliana (O.A.C.)	243	12	1,775	0	1,150	0	3,168	12	
Red River (N.D. Agricultural College)	1,068	12	1,312	8	700	0	3,081	4	
Canadian 2925	737	8	1,112	8	975	0	2,825	0	2925 proved to be a poor strain of "Canadian"
June Pink	381	4	1,643	12	762	8	2,787	8	
Early Prolific (Beebee)	656	4	812	8	637	8	2,106	4	
Red Head (M.A.C.)	518	12	1,175	0	325	0	2,018	12	
Earliest Producer (M.A.C.)	687	8	800	0	362	8	1,850	0	
Premier (Vancouver)	......	......	687	8	400	0	1,087	8	
Moulds' Marvel	......	......	668	8	312	8	981	4	
Santa Rosa (Burbank)	......	......	......	......	562	8	562	8	
Crackerjack (Iowa)	......	......	43	12	368	12	412	8	
Stark's (unnamed)	......	......	......	......	200	0	200	0	
Oxheart	......	......	......	......	200	0	200	0	
Coreless-Livingstone	......	......	......	......	162	8	162	8	

Total yield does not always indicate the worth of a variety. Some of the early varieties produce much superior fruit to others. Some bear a large proportion of good fruit during the early season while prices are highest. These are points to consider.

Project—To demonstrate the growing of tomatoes trained to stakes and to test certain varieties for this purpose.

VARIETY TEST OF TOMATOES ON STAKES, 1926

Variety	Yield per plot		Value of yield per plot	Value of yield per 100 plants	Value of yield from July 17-Aug. 6 per 100 plants	
	lbs.	oz.			Staked	Flat Culture
John Baer	130	13	$6 02	$25 08	......	......
Ideal	84	12	4 00	16 67	......	......
Bonny Best (New Jersey College)	110	10	6 00	28 09	......	......
Earliest Producer (M.A.C.)	150	11	7 28	22 75	$16 71	$13 15
Norfolk	123	10	6 19	19 34	......	......
Earliana (O.A.C.)	129	2	7 44	24 00	18 69	14 40
Canadian 225-B	132	7	7 80	25 16	......	......

Project—Further selection of desirable plants and saving of seed therefrom in connection with the improvement of the new early variety known as "Canadian" which was developed at the Ontario Agricultural College.

Crop—Celery

Project—A number of varieties and types were grown to judge as to their suitability for (a) muck land culture; (b) for use by the market gardener to supply his local demand as existing in southern Ontario; (c) for winter storing purposes.

The green varieties were to be experimented with to test their possibilities for blanching with ethylene gas.

Trade Name of Variety	Seedsman from whom obtained	Remarks
Golden Plume	Garahan (Penn.)	Made best growth of all lots—matured uniformly and early—taller than others of same variety and produced a fairly good compact head with stalks of medium thickness, showing a good heart-foliage, bright, shiny and attractive. A very promising strain.
Golden Plume	Forbes	Not outstanding in any quality—medium tall and not noticeably early for the variety—a good enough average for the type.
Wonderful	Bruce	Remarks similar to Golden Plume (Forbes)
American Golden Self-Blanching	Empire Farms	Remarks similar to those made on Golden Plume.
Vilmorin's New Strain Paris Golden	Vilmorin-Andrieux (France)	Not noticeably taller than Golden Plume types but with a more loose and open head. Not ready to blanch quite as soon as Garahan's Golden Plume, but lost green colour rapidly. This season's seed seemed practically free from off-type plants.
Paris Golden	Steele-Briggs	Noticeably smaller and slower growing than Golden Plume or New Strain types. Stocks are shorter, head more bunched, leaves very much lacinated. Variety not suitable for early celery—not likely to prove as saleable as above-mentioned types when competing against them.
Midgley's Special Golden Self Blanching	Midgley	A strain which appears to do very well and compares with the best Golden Plume strains. It is slightly shorter and has a somewhat more compact head with a good heart—ready for blanching about the same time, and foliage of a good bright attractive colour and condition.
Woodruff's Wonderful	Woodruff	Resembles Midgley's strain in many characteristics, having a more compact solid head, thicker than the ordinary Golden Plume type. *For some reason this strain seemed to suffer earlier damage from late blight than did Midgley's.*

Continued wet, cold weather during the fall months produced an infection of late blight on the lots of celery for winter storage and artificial blanching purposes, so severe as to make them unfit for experimental work.

CROP—EARLY CABBAGE

Project—An experiment was undertaken in which various forms of inorganic nitrogen fertilizers were compared. In addition to the check plot, two other plots were used. Plot 7 received one application of acid phosphate sixteen per cent. at the rate of 1,000 pounds per acre. Plot 8 received an application of muriate of potash at the rate of 400 pounds per acre. Both applications made on day of planting in field.

The nitrogen was applied at the rate of 175 pounds per acre for nitrate of soda and all forms were used in quantities calculated to supply an equal ammonium content.

The plants used in plots 1-8 and check were all of the variety Golden Acre and were a very uniform lot.

The plants of plots 9-11 were all of the same strain of Jersey Wakefield and equally uniform.

The Golden Acre seed germinated March 4th.

The Jersey Wakefield seed germinated March 3 d.

Both lots were set out into the field May 6th.

VALUE OF VARIOUS FORMS OF INORGANIC NITROGEN FOR EARLY CABBAGE

Plot No.	Fertilizer Applied	Weight heads untrimmed	Loss in Trimming	Weight of Heads Trimmed	Good Marketable Heads	Undeveloped Heads	Remarks of June 28th, 1926
		Lbs.	Lbs.	Lbs.			
1	3 applications of $NA\ NO_3$.....	97¼	48	49¼	23	2	Hard and relatively large.
2	3 applications of NH_4, SO_4....	83¼	39½	43¾	17	8	Only fairly hard.
3	3 applications of $NA\ NO_3$. 1 application P_2O_5........	104½	55	49½	16	9	Tend to be soft.
4	3 applications.. 1 application of KCL.......	81	35½	45½	21	4	Some very large heads, generally tend to be fairly large.
5	3 applications of Leunasalpeter	75½	41	34½	11	14	Plants seem to have received a check or set back.
6	3 applications of urea........	90½	46	44½	11	14	Heads somewhat better quality than Plot 5.
7	1 application of acid phos....	81	44	37	12	13	The good heads equal those of Plot No. 1.
8	1 application of KCL........	89½	47	42½	17	8	Heads very firm—one split open.
	Check no treatment........	69½	45	24½	6	18	Heads soft and undeveloped.
							Notes of July 6th, 1926
9	1 application of $NA\ NO_3$.....	91	61	30	..	..	
10	2 applications of $NA\ NO_3$.....	69	50	19	..	..	Poor heads.
11	3 applications of $NA\ NO_3$.....	86½	60½	26	..	..	Heads of only fair average size.

Plots 1-8 and Check (Golden Acre) harvested June 29th, 1926.
Plots 9-11 (Jersey Wakefield) harvested July 6th, 1926.

Crops—Muskmelons

Project—To compare a number of varieties and to learn thei commercial value with rega d to southern Ontario conditions:

Name of Melon	Approximate date of Maturity	Remarks—Field Notes
Golden Champlain...	August 20th.....	Small to medium size—flat ends—limited netting—greenish yellow ground colour—yellow flesh of fair quality. A good early, yellow-fleshed variety.
Sugar Sweet.........	August 21st......	Small size—round—fair netting green flesh—sweet and of fair quality. A popular early green-fleshed variety.
Bender's Surprise....	August 27th.....	A larger melon than Golden Champlain more round in form—rather light in colour of skin, turning to golden shade at maturity—quality and flavour excellent. A good commercial variety.
Extra Early Knight...	August 29th.....	Medium in size—very similar in general characteristics to Sugar Sweet—being a green-fleshed variety.
Extra Early Osage...	August 30th.....	Medium to larger in size—dark green outer colour with fair netting—quality good.
Paul Rose...........	Early September.	Round to oval in shape, medium to above in size, dark green outer colour with fairly good netting—with salmon flesh, good flavour; fruits seem to tend to spot on blossom end.
Shumway Giant.....	September.......	Large, light coloured melons, 12 inches in diameter, flesh pink, quality coarse and only fair flavour.
Fordhook...........	Mid September...	Small to medium, flattened to round in shape, fairly good netting on dark green ground—salmon flesh, good flavour.
Ideal..............	September.......	Medium size, round oval, well netted, attractive and uniform in shape and size, salmon flesh of fair flavour.
Irondequoit.........	September.......	Medium to above in size—round with flattened ends, light in colour—fair netting but not so attractive as some other sorts.
Princess............	September.......	Above medium in size—globular shape, well netted on a dark green ground, attractive salmon flesh on green rind—flavour only fair.
Jumbo Pink.........	September.......	Medium to slightly above in size, long oval shape, well netted, yellow flesh, good flavour.
New De-elicious.....	September.......	Medium in size to slightly above, long oval in shape, well netted, compares closely with Jumbo Pink, but seemed to split more readily.
Hales Best..........	Latter part of September.....	Medium in size—roundish oblong—very well netted, attractive—green flesh, excellent flavour.
Nicholson's Honey-ball...............	October.........	Small round, very late and poor set of fruit, not desirable for our Ontario climate.
Blenheim Orange.... Hero of Lockinge.... Victoria............	....	The seed of these three varieties was obtained from Scotland. The plants grew well, set a fairly good lot of fruit, but appeared to be very susceptible to Bacterial Wilt, and all succumbed before much fruit was ripe. However, the quality of the fruit appeared very good and for late melons the variety, Blenheim Orange, might have some place.

Parsnips

Project—To compare some better, old country varieties, with home grown seed from Winnipeg.

During midsummer, the season was dry and the soil in which the crop was growing tended to dry out, checking the growth of the parsnips as evidenced

by the excessive side-root development and undersize of roots. The comparison, therefore, could not be considered as having given a conclusive test.

Variety	Remarks—Field Notes
Dobbie's Selected	Small roots, with a consequently light yield, nothing of an outstanding or desirable quality appeared in this lot.
Hollow Crown—Dobbie	Small and inclined to be undersized on the average—some good specimens were obtained which showed very desirable characters for the variety.
Main Crop—Dobbie	Small roots, but of good general type and more free from side roots than either of the other two lots. A promising variety if grown under ideal conditions.
Marrowfat—Man. Agr. College	Large roots—heavy yield—roots grew excessively thick at top with abrupt tapering to tip, variety seems to incline to roughness and much side-rooting.

Lettuce

Project—Value of Various Forms of Inorganic Nitrogen for Early Head Lettuce.

Plot	No. fertilizer applications	No. of heads		Weight of marketable heads		No. of marketable heads		Weight of marketable heads		Loss due in weight to poor heads		Weight of single marketable head	
		H. lbs.	N.Y. lbs.	H. lbs.	N.Y. lbs.	H. lbs.	N.Y. lbs.	H. lbs.	N.Y. lbs.	H. lbs.	N.Y. lbs.	H. lbs.	N.Y. lbs.
1	NA NO_3	48	43	68½	45½	45	40	37½	27	31	18½	.83	.67
2	NH_3 SO_4	48	46	68½	62	42	45	37½	39½	31	32½	.89	.87
3	Urea	47	45	59½	47½	38	41	31	35¾	28½	19	.81	.87
4	Check	47	43	47½	49½	26	38	18	27¾	29½	20	.69	.73
5	Cal. Nitrate	48	46	47	45	30	42	19½	24½	27½	20½	.65	.58
6	Leunasalpeter	48	46	54	61	38	41	25½	36¾	28½	24¼	.67	.89

Applications made on the basis of 175 pounds NA NO_3 per acre, using ammonia equivalent to determine amounts.

NOTE.—June 7th—by mistake rows 1 and 2 received an extra heavy application.
Row 1—1 pound 12 ounces NA NO_3 instead of 8 ounces.
Row 2—1 pound 5 ounces NH_3 SO_4 instead of 6 ounces.

Peas

Project 1—Variety test to determine the value of some old country varieties in comparison with some standard varieties of home-grown seed.

The following varieties from English and Scotch seed houses were grown:

Bedford Champion	Prelude	Kelvedon Wonder
Duplex	Chencelot	Excelsior
Hundredfold	Pioneer	Acquisition

Of the above, Bedford Champion, an early dwarf variety, showed promise after acclimatization.

Excelsior—A later dwarf variety, but a vigourous grower, gave equally good promise.

Acquisition (Sutton's)—An early dwarf with spreading habits appeared to be a heavy yielding variety with large pods containing a uniformly large number of good sized peas.

Project 2—To demonstrate the value of seed produced in Northern Ontario against that from ordinary commercial sources. Peas grown during 1925 at Fort William, Ont., and of the varieties Thos. Laxton and Gradus.

Seed of Thos. Laxton and Gradus were secured from a reliable seed merchant and equal plantings made side by side with the two northern-grown lots.

The northern-grown seed germinated more rapidly, gave a very much improved stand and the plants retained their superiority in growth and yield throughout the season.

The two plots of Thos. Laxton were harvested and the pods weighed:

Weight of pods from northern seed, 5 pounds 12 ounces.
Weight of pods from stock commercial seed, 1 pound 6 ounces.

The other two lots would have shown a similar result in favour of the northern seed.

SPINACH

Project—To demonstrate the value of seed grown in Northern Ontario over ordinary southern-grown commercial stock.

Variety used—Virginia Savoy.

The northern seed was grown at New Liskeard in the season of 1925. The commercial seed was obtained from Norfolk, Va., where the variety originated.

Demonstration plot:

Planted May 6th, 1926—two rows, twenty-four inches apart.

Seed sown with seed drill in unfertilized but well-prepared ground.

Observations—Stand of northern-grown seed more uniform and plants show more vigourous growth. As summer heat came on, not so many plants from northern seed bolted to seed stocks.

Harvest records—Source of seed	Weight of marketable Spinach	Weight of Seeders	Total
New Liskeard (Northern Ontario).....	29 lbs. 13 oz.	2 lbs. 8 oz.	32 lbs. 5 oz.
Norfolk, Va.........................	18 " 8 "	3 " 1 "	21 " 9 "

A further test was made with a fall crop and it further confirmed the spring crop results.

SWEET CORN

Project—To arrive at the dates of maturity of several varieties of sweet corn for use in southern Ontario.

Other work was planned as well with this crop but the severity of the attack of the corn borer forced its abandonment.

Varieties grown	Approximate number of days from planting until first picking could be made	Value of corn as a gardener's variety
Berney's Golden Swift....	63 days	Valued only as a first early yellow corn.
Early White Cory........	73 "	A good early white corn.
Early Malcom...........	77 "	A good corn, but matures close to Golden Bantam type.
Sunshine Sweet (N.D. Agr. College)...............	78 "	A promising yellow corn, much similar to Golden Bantam.
Golden Bantam..........	81 "	A first-class yellow corn, and a standard amongst growers.
Golden Bantam (N.D. Agr. College *Special strain*)..	81 "	*No improvement on good* Canadian strains.
Whipples New Yellow....	85 "	A good corn of high quality.
Country Queen..........	89 "	A Golden Bantam hybrid and of good quality.

Experimental Projects with Indoor Crops

Experimental work undertaken this year was with only one crop as a major project. The tomato crop offered the only possibility of carrying out needed work along commercial crop lines, owing to the limited space at our disposal as well as to the lack of sufficient quantities of stock plants in flowers.

Tomato Crop

The tomato crop was planned to be grown for two definite purposes:

1. To test seven selected varieties and strains as to their value for planting for fall crop use.

2. To enable a study to be made of various factors and methods of culture which have an influence on the amount of marketable fruit obtained from the crop.

The results of the experimental records and other observations made on this crop will be concluded in 1927.

New Zealand Spinach

One bench of New Zealand spinach is being grown in order to compare it with lettuce as to its value as a substitute crop for use in relieving lettuce growers, who now find that crop unprofitable during a part of the year, at least.

The results from the spinach crop will not be known until the crop has run on into 1927. So far, yield and returns have been poor and the crop is not doing as well as expected of it.

Extension Work for Summer Season of 1926

Nature of Work—1. Conducting of co-operative experimenta in problems of economic interest to southern Ontario growers of horticultural crops.

2. Visiting fruit growers, truck crop growers and greenhouse operators in the Counties of Middlesex, Elgin, Kent and Essex in order to keep in contact with the progress of these branches of horticultural industry, to discuss and to study problems affecting same and where acceptable to offer service and suggestions.

Co-operative Experiments

Tomatoes—Fertilizer experiments similar to those carried out in 1925, were undertaken with early tomatoes. Two large growers of this crop were selected in the Leamington district and the data concerning the experiments appear in the following tables:

Fertilizer test plot conducted at Experimental Farm gardens to determine relative values of various fertilizer mixtures and materials in producing early fruit.

EARLY TOMATOES

Plot No.	Fertilizer Analysis	Yield per plot		Value of yield per plot	Value of yield per acre	Value of increase over check per acre	Cost of fertilizer	Return for $1 spent in fertilizer	Value of late picking per acre
		lbs.	oz.						
1	0-16-0	81	9	$5 40	$540 00	....	$9 60	....	$13 00
2	0-12-4	97	8	5 86	586 00	....	12 88	....	16 00
3	0-10-4	120	0	6 85	685 00	$21 00	12 08	$1 73	16 00
4	0-8-4	126	10	6 62	662 00	....	11 28	....	17 00
5	2-12-4	153	5	8 01	801 00	137 00	16 20	8 45	26 00
6	4-12-0	143	15	6 73	673 00	9 00	17 80	50	26 00
7	2-12-0	145	8	7 96	796 00	132 00	15 70	8 40	27 00
8	2-12-2	145	8	7 96	796 00	132 00	15 70	8 40	27 00
9	Superphosphate	162	7	9 11	911 00	247 00	9 19	26 87	32 00
10	Raw Rock phosphate	176	2	8 98	898 00	234 00	9 19	25 46	31 00
11	Basic phosphate	163	3	8 55	855 00	191 00	5 29	36 10	26 00
Check—No fertilizer		140	1	6 64	664 00	....	....	....	34 00

This experiment, similar in plan to the two co-operative experiments was carried out in ground not subject to such heavy fertilization and the experiment itself was more directly under control.

EARLY TOMATOES

Robt. Maxwell & Son, Leamington, 1926

Plot No.	Fertilizer Analysis	Yield per plot		Value of yield per plot	Value of increase over check	Cost of fertilizer	Value of yield per acre
		lbs.	oz.				
1	0-16-0	88	4	$9 04	$1 45	$9 60	$904 00
2	0-12-4	78	1	8 00	41	12 88	800 00
3	0-10-4	77	9	7 95	36	12 08	795 00
4	0-8-4	72	14	7 47	.....	11 28	747 00
5	2-12-4	74	0	7 58	.....	16 20	758 00
6	4-12-0	83	9	8 56	97	17 80	856 00
7	2-12-0	81	13	8 38	79	15 20	838 00
8	2-12-2	72	14	7 47	.....	15 70	747 00
9	Acid phosphate	75	11	7 75	16	9 19	775 00
10	Raw Rock Phosphate	63	11	6 52	....	9 19	652 00
11	Basic Phosphate	42	8	4.35	.....	5 29	435 00
Check	—No Fertilizer	74	1	7 59	.....	......	759 00

The results from this plot are more subject to experimental error than is usual. The land had been in past seasons heavily fertilized. When the plants were set out, two plow furrows existed and two rows had to be planted near the furrow (rows 9 and 10).

The stand was also poor in some rows and an average per plant per row was struck to bring all to a uniform basis.

Early Tomatoes

E. J. Atkin, Leamington, 1926

Plot No.	Fertilizer Analysis	Yield per plot		Value of yield per plot	Value of increase over check	Cost of fertilizer	Return for $1 spent in fertilizer	Value of yield per acre
		lbs.	oz.					
1	0-16-0..........	123	9	$8 61	....	$9 60	....	$861 00
2	0-12-4..........	123	15	8 64	....	12 88	....	864 00
3	0-10-4..........	136	8	9 32	....	12 08	....	932 00
4	0-8-4...........	135	14	9 29	....	11 28	....	929 00
5	2-12-4..........	120	3	8 45	....	16 20	....	845 00
6	4-12-0..........	105	5	7 16	....	17 80	....	716 00
7	2-12-0..........	115	7	8 41	....	15 20	....	841 00
8	2-12-2..........	108	13	7 96	....	15 70	....	796 00
9	Acid Phosphate..	105	1	7 87	....	9 19	....	787 00
10	Raw Rock Phosphate.........	113	6	8 51	....	9 19	....	851 00
11	Basic Phosphate..	127	8	9 28	....	5 29	....	928 00
Check	—No Fertilizer...	140	3	9 74	....	......	....	974 00

The results as shown in the above experiment would apparently show a negative result from the use of fertilizer. The explanation offered for this situation is that the land used for the experiment is in a very high state of cultivation, being used in alternate years for growing melons for which crop it is heavily manured and fertilized. Applications of fertilizer for tomatoes here appear to be wasted.

Onions—Following up work previously started in 1924 from the Department of Horticulture at the Ontario Agricultural College, Guelph, a fertilizer plot was continued at the Rondeau Marsh. The results of this season's work appear in table form on a following page.

Onion Maggot Control

Heretofore all control measures for onion maggot have either proven ineffective or impracticable when tried on the extensive areas where onions are grown as a specialized commercial crop in southern Ontario.

Encouraged by results obtained on a plot started in 1925 with a new method in which the writer, co-operating with Professor L. Caesar, of Guelph, obtained fairly successful results, a further demonstration plot was arranged for 1926. Mr. D. R. Sands, of the Department of Botany, O.A.C., co-operated in working out this test.

Location—Pelee marsh, farm of J. A. Campbell.

A plot known to be in the probably infested area was chosen and five 5-row blocks of onions were selected, lying adjacent to one another.

Material Used

(a) Oil and fish-oil soap were made into an emulsion, being heated to aid emulsification.

Note.—Onions had been showing above ground for less than one week. No maggot or fly observed in crop to date; though adult fly had been active previous to this date in waste onion piles.

(b) Oil and copper sulphate—Hydrated lime emulsion was made under the cold formula.

Applications made:

May 20th, 1926—First application:
Plot 1, five rows—Oil soap emulsion.
Plot 2, five rows—Oil-Bordeaux emulsion.

May 28th, 1926—Second application:
Plot 3, five rows—Oil—Bordeaux emulsion.
Plot 1, four rows only—Oil soap emulsion.
Plot 2, five rows—Oil—Bordeaux emulsion.

June 3rd—Third application:
Plot 4, five rows—Oil—Bordeaux emulsion.
Plot 1, three rows only—Oil soap emulsion.
Plots 2 and 3, five rows each—Oil—Bordeaux emulsion.

June 10th—Fourth application:
Plot 1, one row only—Oil soap.
Plots 2, 3, 4, 5, five rows each—Oil—Bordeaux.

OBSERVATIONS

Owing to the scarcity of onion seed for the 1926 crop, much old seed of poor germinating ability was used by growers in 1926. Mr. Campbell was one of these and, coupled with this, was the very cold backward spring season of 1926. As a result of these factors, a poor stand of onions resulted. It was soon seen that the test plots selected were so uneven in stand that a harvest of the crop at maturity would have no bearing on the results of the experiment, so results were judged by frequent careful observations made on the plots while the crop was growing.

SUMMARY

The summary of observations conducted by both Mr. Sands and the writer led to the conclusion that the first two sprayings had proven effective, particularly did the first spray seem to have been timely in its application. The later sprayings, as well as could be judged, were of some value but the maggot was operating in the onions, apparently to a greater extent, proportionately with the later sprays.

Onion maggot did greater damage on the Pelee marsh in 1926 than in any season, ever before coming to the attention of the writer. Some whole blocks of pickling onions were made worthless while the main crop in the large area where the experiment was conducted was badly damaged. The early sprayed plots were noticeably freer from attack and it would appear that this method of control was well worthy of consideration and adoption by muck land onion growers.

ONIONS

Project—To conduct an experimental plot on muck land at the Experimental Farm, in order to determine the best fertilizer mixtures to use for the production of bulb onions:

Plot Number	Fertilizer Analysis	Yield per Acre		Waste	Total Market-able Onions	Increase Over Check	Value of Increase Over Check	Cost of Fertilizer	Return for $1.00 Spent in Fertilizer
		Small	Large						
		lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.			
1	0-8-6	3,750 0	20,262 8	600 0	24,012 8	5,637 8	$84 56	$17 82	$4 74
2	2-8-6	6,787 8	21,375 0	881 4	28,162 8	9,787 8	146 81	23 28	6 30
3	4-8-6	7,387 8	19,950 0	937 8	27,337 8	8,962 8	134 43	26 76	5 02
4	6-8-6	7,612 8	21,075 0	412 8	28,687 8	10,312 8	154 68	30 66	5 04
5	8-8-6	5,287 8	20,700 0	862 8	25,987 8	7,612 8	114 18	34 56	3 30
6	0-4-4	3,787 8	18,075 0	675 0	21,862 8	3,487 8	78 47	14 52	5 40
7	0-6-4	4,087 8	22,275 0	300 0	26,362 8	7,989 8	119 81	15 72	7 62
8	0-8-4	7,987 8	20,725 0	450 0	28,712 8	10,337 8	155 06	16 92	9 16
9	0-10-4	4,012 8	18,825 0	787 8	22,837 8	4,462 8	66 93	18 12	3 69
10	0-12-4	4,087 8	16,125 0	937 8	20,212 8	1,837 8	27 56	19 32	1 42
11	0-8-8	1,387 8	13,312 8	1,284 6	24,700 0	6,325 0	94 87	18 72	5 06
12	0-8-10	3,787 8	17,025 0	1,500 0	20,812 8	2,437 8	36 56	19 62	1 86
13	0-8-12	3,937 8	17,775 0	975 0	21,712 8	3,337 8	50 06	20 52	2 43
14	4-8-10	2,587 8	18,975 0	1,068 12	21,562 8	3,187 8	47 81	28 56	1 67
15	4-10-12	1,575 0	24,825 0	450 0	26,400 0	8,025 0	120 37	30 66	3 92
Average Check	No fert.	5,812 8	12,562 8	1,350 0	18,375 0	....	......	......	.....

"Small" onions were those of good quality and sound and firm—*readily* saleable as a smaller grade.
"Large"—Large onions were those from which the smaller ones had been culled.
"Waste"—Thick necks, green tops, rotten or in any way worthless onions.

RESULT OF FERTILIZER TEST ON ONIONS AT RONDEAU MARSH, 1926

Plot Number	Fertilizer Analysis	Yield per Acre: Manure L.	Yield per Acre: Manure S.	Yield per Acre: Lime L.	Yield per Acre: Lime S.	Check L.	Check S.	Total Marketable Onions	Increase Over Check per Acre	Value of Increase Over Check	Cost of Fertilizer	Return for $1.00 Spent in Fertilizer
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.			
1	0-8-6	8,075	94	7,359	328	9,000	468	24,434	5,756	$86 34	$17 82	$4 84
2	2-8-6	8,859	187	5,494	562	7,312	328	21,665	2,987	44 80	23 28	1 92
3	4-8-6	8,250	187	6,703	281	6,750	609	21,603	2,925	43 87	26 76	1 63
4	6-8-6	7,687	140	7,453	562	8,075	375	23,215	4,537	68 05	30 66	2 21
5	8-8-6	9,656	187	5,156	562	5,906	562	20,718	2,040	30 60	34 56	88
6	0-4-4	9,468	140	5,531	656	5,812	656	20,811	2,133	32 00	14 52	2 20
7	0-6-4	9,937	281	6,440	468	5,437	750	21,814	3,136	47 04	15 72	2 99
8	0-8-4	9,515	187	5,718	619	7,500	421	22,733	4,055	60 82	16 92	3 59
9	0-10-4	9,375	234	4,593	328	4,734	468	18,702	24	36	18 12	02
10	0-12-4	8,484	187	7,125	421	5,625	328	21,234	2,556	38 34	19 32	1 98
11	0-8-8	8,109	234	6,187	515	6,234	562	20,530	1,852	27 78	18 72	1 48
12	0-8-10	8,437	187	6,468	619	6,797	468	21,702	3,024	45 36	19 62	2 31
13	0-8-12	9,656	187	7,171	468	7,593	375	24,320	5,642	84 63	20 52	4 12
14	4-8-10	8,062	94	6,937	468	7,687	375	22,686	4,008	60 12	28 56	2 10
15	4-10-12	10,120	94	7,125	468	7,875	937	25,120	6,442	96 63	30 66	3 15
Check	No fertilzr.	9,187	187	4,265	679	5,226	586	18,678	....	......	......	....

ARTIFICIAL FERTILIZERS FOR EARLY POTATOES

Considerable work has been undertaken on the farm and on surrounding farms; the general conclusions drawn from the four years' work are as follows:

(1) That at least two per cent. nitrogen in soluble form should be used. Where the land carries sufficient, but not in soluble form, the two per cent. will act as an insurance against retarded growth during a cold, backward spring.

(2) The amount of nitrogen used should not exceed approximately five to six per cent. The fertility of each individual field has to be considered.

(3) The use of clovers should render the application of more than two per cent. unnecessary.

(4) Sixteen per cent. acid phosphate up to ten and twelve per cent. can be used in southwestern Ontario to very good advantage financially.

(5) More work will have to be done to ascertain the percentage of potash but indications point to a range of from four to eight per cent.

(6) Six hundred pounds of a mixture carrying approximately the amounts of nitrogen, acid phosphate and potash mentioned can be generally recommended per acre under reasonable conditions of fertility. However, the wide range of fertility of farms must always be given consideration before very much fertilizer should be purchased for early potatoes.

The above conclusions do not necessarily apply to late potatoes.

The co-operative sugar beet plots for the testing of fertilizers upon sugar beets give very excellent promise of results but no definite conclusions can be drawn until at least two more years of such work have been carried on.

In 1924 and 1925, the farmers were asked to superintend the thinning and weeding, but in 1926 this was undertaken by the Experimental Farm, in order to have a better control of the plot.

The outstanding factor that will always come to the forefront in such experiments has already become pronounced; that no two farms require the same treatment and that generally any farm requires somewhat different treatment according to the seasons. Undoubtedly it pays to fertilize in a general way for a cash crop as insurance against unfavourable weather; there is one exception in the plots, and an analysis of the results over a period of two years is interesting; in 1925 the acid phosphate alone gave the best results; in 1926, a 2-12-4 mixture was best with the acid phosphate a very close second. The amount of available nitrogen was evidently in sufficient quantities for maximum yields. Perhaps the addition of two to four per cent. of potash would be advisable.

The amount of nitrogen that should be added for general use cannot or should not be estimated from two or three years' work but two per cent. in an available form might well be recommended on all farms, except where special tests have been made, to give the young plants a strong start. It is doubtful, except on poor farms, whether the sugar beet crop can carry a fertilizer with more than two or four per cent. nitrogen. In three cases in 1926, mixtures carrying four and six per cent. did well but in two cases the land was not in the highest state of fertility and, moreover, the season seemed to demand a higher percentage of nitrogen than did 1925.

Because this section of the country is deficient in phosphates, there is no doubt about a mixture carrying eight to twelve per cent. phosphoric acid.

The amount of potash required will no doubt fluctuate somewhat with the amount of available nitrates in the soil. The experiments so far have shown

nothing very definite along this line except that, where a reasonable amount of potash was used, the tests for sugar remained a little more constant than where the potash was low or omitted.

Where the farms had produced abundant crops of clover for ploughing down, the acid phosphate gave excellent results demonstrating rather clearly that the overhead in the production of sugar beets may be reduced by the liberal use of clover even though some other crop may intervene between the clover and the beet crop.

Feeding Experiments

Beef Cattle—Steers

Fed during Winter of 1925-26

20 steers, average weight 1,012.5 pounds.
20,250 pounds at $6.60 cwt., $1,336.50.
February 12th sold 1 steer to butcher, $70; estimated weight, 1,050 pounds.
February 13th steer became sick; estimated weight, 1,400 pounds.
Total weight of cattle and selling price:

Sold April 10th	21,770 pounds at 8 cents			$1,741 60
	1,000 " 7 "			70 00
Sold Feb. 12th	1,050 "			70 00
Sold Feb. 13th sick steer	1,400 " hide			6 09
	25,220 pounds			$1,887 69
	Selling price	$1,887 69		
	Cost price	1,336 50		
	Gain	$551 19		

18 steers fed for 154 days }
2 " " 98 " } or equal to feeding 2,968 days.
Total gain, 4,970 pounds, or 1.67 plus pounds per day.

Feed Consumed

32 tons of Ensilage at $3	$96 00
3,438 pounds of Corn at 1½ cents	51 57
3,297 pounds of Barley at 1¼ cents	41 21
927 pounds of Soy Beans at 3 cents	27 81
120 pounds of Oats at 1 1/3 cents	1 60
6 loads of Corn Fodder at $4	24 00
8 loads of Bean straw at $4	32 00
1,000 bushels of roots at 10 cents	100 00
	$374 19

Cost per pound gain:
4,970 pounds cost $374.19, or 7.52 plus cent per pound.

Total cost—Steers	$1,336 50
Feed	374 19
	$1,710 69
Total sales	$1,877 69
Net gain	177 00

The proceeds from the sale of the steer that died would have been profit and at eight cents would have reached at least $120.00.

SWINE EXPERIMENT, 1926

Effect of Feed on the Quality of the Finished Product

Pen No.	Breed and Number of Pig	Weight at Beginning	Gain	Corn	Oats	Shorts	Tankage	Mineral	Barley	Alfalfa	Blood Meal	Total Cost	Cost per 100 Pounds
		lbs.	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	lbs.		
1	1 Tamworth, 2 Yorks....	165	406	....	1,110	375	....	73	540	....	....	$30 37	$7 48
2	1 Tamworth, 2 Yorks....	160	399	....	1,273	637	....	75	....	....	...	28 65	7 18
3	1 Tamworth, 2 Yorks....	157	427	....	1,270	635	....	75	....	326	...	29 39	6 88
4	1 Tamworth, 2 Yorks....	130	495	437½	875	875	....	75	....	....	18¾	34 65	7 00
5	1 Tamworth, 2 Yorks....	111	509	1,304½	549	93	153½	75	....	326	...	37 87	7 44
6	1 Tamworth, 2 Yorks....	128	447	410	307½	....	....	75	883	297½	101	29 81	6 67

This report only shows part of the experiment which is a duplicate of last year's work. The sides are being cured at William Davies Company.

NORTHERN ONTARIO DEMONSTRATION FARM

Spring weather opened up favourably and fields worked up in a wonderful state of tilth. Seeding was done under almost ideal conditions. Germination was satisfactory and early growth quite rapid. A heavy rain fall coming soon after the crops appeared above ground did some damage. Crops recovered splendidly, however, and produced a good stand. Excellent crops would have been realized except that a bad attack of grain rust (unusual to the district) hit the grain about the time it was filling and greatly reduced the quality of oats more than other cereals.

The demonstration of fall wheat, consisting of a fifteen-acre field, yielded at the rate of twenty-six bushels per acre. It is only fair to state that rust injured this crop to some extent and it was seeded on land that had only been ploughed once before. The demonstration was regarded as being sufficiently worth while to have repeated, and this fall a field of twenty acres was seeded. This was done ten days earlier than a year ago and as a result it went into winter quarters in more excellent condition than during the former year.

The distribution of pure bred live stock has continued as a principal feature of our work, especially in the selling of young Shorthorn bulls, Holstein bulls, calves and shearling rams. Distribution of shearling rams is possibly more desirable than selling ram lambs. By keeping them over they can be culled to better advantage and distribute a higher type of sheep. The inauguration of club sheep work is possibly the outstanding feature of the live stock extension programme and for the coming year there will be six flocks distributed to junior farmers.

Three pure-bred Yorkshire hogs (two sows and one boar) were added to the farm, being purchased at the annual O.A.C. sale. These hogs are of high quality and we hope will help improve the hog industry of the north country.

An implement shed and milk room were added to the farm buildings and are serving a very useful purpose.

Red clover as a silo crop is being demonstrated again this year and giving good results. This crop will prove a useful silage crop throughout Northern Ontario.

Dates of Farm Operations

The dates upon which the more important farm operations commenced for the past year, are as follows:

First work on land	May 13.
Seeding Garnet Wheat	May 29.
Seeding Victory Oats	June 3, 4.
Seeding Assalman Oats	June 4, 5.
Seeding O.A.C. No. 72 Oats	June 8, 9.
Seeding O.A.C. No. 3 Oats	June 10, 14, 15.
Seeding Alaska Oats	June 11.
Seeding Barley	June 17.
Planting Potatoes	June 22.
Seeding Turnips	June 23.
Seeding Winter Wheat	August 21.
Ploughing stopped by frost	November 5, 17.
Cutting Hay (first)	July 24.
Cutting Alfalfa (first)	July 20.
Cutting Alfalfa (second)	September 3.
Cutting O.A.C. No. 3 Oats	September 8, 9, 14, 15.
Cutting Alaska Oats	September 10.
Cutting Garnet Wheat	September 13.
Cutting Assalman Oats	September 17.

Cutting Barley	September 22.
Cutting O.A.C. No. 72 Oats	September 23.
Cutting Victory Oats	September 28, 29.
Digging Potatoes	October 11.
Harvesting Roots	November 2.
Threshing	September 17.
Silo Filling	July 16, August 27.

Seasonal Notes

It will be noted from the previous table that the first work on the land commenced May 13th, as compared with April 29th the previous year. This date does not represent the average for the district and is accounted for by the fact that the farm fields are comparatively level and do not drain off as rapidly as the higher land.

Precipitation for the year is noted as 20.38 inches, slightly less than during 1925 when 23.38 inches fell. The total is also slightly below the average for the past four years and about the same as the average for the last thirty-two years. It may be of interest to note that the month of July recorded the greatest precipitation during the year.

The highest temperature for the year occurred August 3rd, and registered eighty-nine degrees. This is considerably below the highest temperature for 1925, when a temperature of ninety-four degrees was registered early in June. It will therefore be noted that the season was slightly cooler, on the whole, than during the previous year, the average highest temperature for 1925 being 63.75 degrees; 1926, sixty-two degrees, the average lowest temperature 28.66 degrees as compared with 26.5 degrees.

In comparison with these figures it is interesting to note, however, that there was a greater total number of hours sunshine in 1926 than in 1925, 1,574.5 as compared with 1,509.7. The month of May totalled the greatest number of hours sunshine for any month during the year.

The frost-free period of seventy-five days is considerably below that of ninety-one days for the previous year. The average as noted in last year's report is 125 days. Early frosts, however, were so very slight that crops suffered really no damage at all.

Weather Records

Precipitation:

Total precipitation for the year November 1st, 1925, to October 31st, 1926	20.39	inches
Average precipitation for the last four years	21.88	"
Total precipitation for seven months, ending October 31st, 1926	15.01	"
Average for thirty-two years for the same period	20.15	"
Month having greatest precipitation	July	
Total precipitation during month of July	4.65	"

Temperature:

Highest temperature	August 3rd, 1926	89	degrees
Lowest temperature	January 12th, 1926	-34	"
Last frost	June 16th, 1926		
First frost	August 31st, 1926		
Frost-free period	75 days		

Average frost-free period (thirty-two years).........121 days
Shortest frost-free period on record.................. 73 days, year 1923
Longest frost-free period on record..................157 days, year 1909

Sunshine:

Bright sunshine on.......................................246 days
Total hours bright sunshine.................................. 1,574.5
Average hours sunshine per day.............................. 6.4
Yearly average hours of sunshine (four years).................. 1,784.09
Yearly average number of days with bright sunshine............ 246.5
Month having greatest amount of sunshine, May, 1926.......... 28 days
Average hours per day during May........................... 8.38
Month having least sunshine, December, 1925.................. 13 days
Average hours per day during December...................... 3.69

WEATHER OBSERVATIONS, 1925-1926

Month	Temperature						Sunshine	
	Highest	Date	Lowest	Date	Average	Average for 32 Years	Days of Bright Sunshine	Hours of Sunshine
November, 1925...	48	4 & 21	—22	29	27.58	*29.1	13	50.5
December........	41	5	—30	27	14.40	*10.0	13	48.0
January, 1926.....	36	17	—34	12	8.80	† 1.7	14	64.9
February.........	33	15 & 17	—30	20	5.02	† 6.2	23	127.5
March...........	45	21	—33	16	11.50	†16.5	27	180.0
April............	49	24	—19	15	25.51	36.0	23	149.2
May.............	82	31	10	4	45.55	50.0	28	234.8
June............	82	12	29	16	58.85	60.7	26	197.0
July.............	84	31	35	3	63.68	66.0	25	180.6
August...........	89	3	32	31	60.99	62.5	19	149.1
September........	73	19	24	26	52.10	54.7	19	116.9
October..........	82	4	20	1 & 9	41.22	42.4	16	77.0

* Average for three years only. †Average for four years only.

PRECIPITATION

Month	Rain		Snow		Total as Rain		Average for 32 Years
	Days Rain Fell	Inches	Days Snow Fell	Inches	Days	Inches	
November, 1925...........	8	1.48	10	T	17	1.45	*1.05
December...............	7	.63	20	1.0	24	.75	* .93
January, 1926............	2	.18	18	6.6	18	.84	† .98
February...............	....	....	11	6.5	11	.65	†1.27
March..................	....	....	6	17.0	6	1.70	1.33
April..................	4	.40	15	13.0	16	1.70	1.77
May....................	12	1.89	5	1.1	15	2.00	2.65
June...................	18	1.56	1	T	18	1.56	2.81
July...................	15	4.65	....	....	15	4.65	3.62
August.................	12	1.94	....	....	12	1.94	2.80
September..............	13	1.13	....	....	13	1.13	3.29
October................	18	2.03	7	.08	21	2.038	2.84

*Average for three years only. †Average for four years only.

Direction of Wind

Month	By 12-Hour Periods								
	N	NW	W	SW	S	SE	E	NE	Prevailing Direction
November, 1925	3	10	20	1	3	6	6	2	W
December, 1925	1	16	20	1	..	6	10	1	W
January, 1926	4	10	14	10	..	10	8	1	W
February	..	22	5	1	3	4	5	1	NW
March	9	28	3	2	..	9	6	6	NW
April	3	15	20	4	2	6	7	..	W
May	7	24	8	1	4	11	3	..	NW
June	4	18	7	2	3	12	5	2	NW
July	1	20	16	1	1	5	5	2	NW
August	1	15	14	..	2	9	8	2	NW
September	4	10	18	2	1	11	6	2	NW
October	2	10	25	2	3	5	8	2	W

ANIMAL HUSBANDRY

Dairy Cattle—The dairy cow is featured as one of the important things in connection with the live stock work of the farm and special efforts are being made to improve the quality of the Holstein herd. Some of the young stock purchased a year ago did not measure up to expectations, and will be culled. The calves from Champion Hartog Canary, while strong in constitution, appear to lack type to some extent and we are seriously considering the purchase of a new herd bull to replace the one already referred to. Type and test along with size are the features being kept in mind in building up the farm dairy herd. We believe a high butter-fat test to be possibly more important along with average production than exceptional production with a low test.

The five heifers purchased as calves from the Monteith Academy freshened during the year for the first time, showing up especially well. The triplet heifers gave birth to heifer calves, while the twin heifers each gave birth to a bull calf.

Shorthorn Cattle (*Dual Purpose*)—The Shorthorns have given a very credible account of themselves during the year and the offspring from Master Melody is of a high standard. It is interesting to note that many farm visitors inquire regarding the dual purpose Shorthorns. They appear to be in general favour with a large number of farmers and for this reason efforts will be made to keep the herd at a high standard. A number of very fine calves were sold to settlers during the year. Two tests made during the year for tuberculosis showed the herd to be entirely clean.

DAIRY HERD RECORDS

Name of Cow	Breeds	Age at Beginning of Lactation Period	Date of Freshening	Number of Days in Period	Total Pounds of Milk Produced	Daily Average Yield of Milk	Average Percent. Fat	Value of Whole Milk at 10c. per Quart	Number Pounds of Butter-fat
Lady Cruickshank	Shorthorn	8 years	Mar. 3	242	7,726	31.92	4.5	309 04	347.67
Lady Refiner 2nd	"	2 "	Oct. 18	13	274	21.07	....	10.96	* 8.9
Rosebud Patricia	"	2 "	Oct. 8	23	518	22.52	5	20.72	45.9
Abbekerk Hartog Johanna	Holstein	4 "	Jan. 9	263	7,510	28.51	3.6	300.40	270.36
Academy Maggie Abbekerk	"	2 "	Mar. 24	221	7,855	35.53	3.5	314 20	274.92
Academy Mary Sylvia	"	2 "	April 1	214	6,594.5	26.14	3.6	223 76	237.4
Academy Nellie DeKol	"	2 "	Mar. 27	218	7,138.5	32.74	3.7	285 52	264.12
Academy Pauline Echo	"	2 "	April 21	193	7,790	40.40	3.7	311 60	288.23
Academy Pontiac Echo	"	2 "	Mar. 18	227	7,587.5	33.42	3.6	303 27	273.15
Bessie Dutchland Schuiling	"	3 "	Sept. 25, 1925	441	10,389	25.90	....	415 56	*337.64
Daisy Artis Dutchland	"	2 "	Aug. 24, 1925	402	10,389	25.82	....	415 56	*337.64
Francy Johanna Hartog	"	3 "	Jan. 3	270	7,825.5	28.97	3.8	321 94	297.29
Johanna Butter Lass DeKol	"	3 "	Dec. 27, 1925	307	8,725	28.71	3.9	339 00	340.27
Lady Pietje Rolo Beets	"	3 "	Aug. 13, 1925	282	5,886	20.87	....	235 44	*191.29
Lady Rolo Beets	"	6 "	Mar. 18	227	9,297.5	40.95	3.6	371 90	334.71
Lady Snowflake of Temiskaming	"	2 "	Sept. 28, 1925	444	10,889	24.52	....	435 56	*353.89
Pauline Johanna DeKol	"	3 "	Jan. 8	143	3,082	22.50	3.8	123 28	117.11
Queen Patsy Johanna	"	3 "	Jan. 4	147	2,723	18.58	3.5	98 92	95.30
Valentine Segis Keyes	"	4 "	Feb. 26	247	8,614	34.92	3.4	344 56	292.87
Faforit Hartog Johanna	"	2 "	Dec. 24, 1925	288	8,521	30.44	3.9	340 84	332.31
Totals		60 "		4,812	149,433.5	574.58	57.1	$5,513 03	5,140.97
Averages		3 "		240.6	7,421.7	28.72	3.8	275 65	257.05

*These cows are not on official test.
Butter-fat given is on a basis of 3.25 per cent. test.

Dairy Herd—October 31st, 1926

1 Mature Bull
17 Mature Cows
10 Heifer Calves { 6 senior yearlings
4 junior yearlings.

Shorthorn Herd (Dual Purpose)—October 31st, 1926

1 Mature Bull	5 Mature Cows
3 Heifers	2 Calves.

Service Record of Bulls

Month	Holstein		Shorthorn	
	Demonstration Farm	Others	Demonstration Farm	Others
1926				
January,	1	..	4	5
February	2	1	..	..
March	1	1	..	1
April	..	1	..	2
May	..	..	..	1
June	5	1	..	4
July	1	1	1	4
August	7	..	1	2
September	..	1	..	..
Totals	17	6	6	19

Five farmers used the Holstein bull.
Seven farmers used the Shorthorn bull.

Sheep—Reference has already been made to the importance of this phase of the live stock work and it is a well recognized fact that sheep-raising is an important thing throughout many parts of Northern Ontario. Throughout the Districts of Temiskaming and Cochrane, one does not hear of ravages from wolves, but some damage was done during the year by dogs. The farm flock escaped any worrying by dogs.

Lambing results were much superior to those of the former year. Fifty-three ewes gave a total of seventy-six lambs, or an average of 1.43 per ewe. Invariably they came strong and healthy.

The flock is regarded as somewhat too large at the present time and plans are being made to cull it rather severely. It is the intention to increase the standard of the flock and produce better stock for distribution that will be a credit to the institution. A greater number of ram lambs will be carried over to be sold as shearlings during the coming year than ever before. The demand is more for shearling rams than for ram lambs. This system also permits of better selection and the distribution of a more typy and desirable ram.

The following grading table is interesting from the fact that this year there are 185 pounds of medium staple as compared with nine-five the previous year. This is attributed altogether to care in winter feeding. At no time was feed put in the racks when the sheep were in the yard. Undoubtedly it paid well to take a little time and shut the sheep up before feeding. This permits keeping the wool very free from hay chaff and seed, and a already stated, gave a much better grading.

CANADIAN CO-OPERATIVE WOOL GROWERS, LIMITED

Grade	Pounds 1925	Pounds 1926
Medium Staple	95	185
Medium Clothing	35	4
Low Medium Staple	515	343
Low Medium Clothing	10	...
Medium Seedy, light	152	11
Medium Tags	45	18
Medium Tub Washed	3	...
Totals	855	561

NOTE.—With fewer sheep clipped have doubled top grade. No value received yet.

Sheep—October 31, 1926

1 Mature Ram 23 Mature Ewes
19 Ewe Lambs.

Reserved for Club Work

18 Mature Ewes 12 Ewe Lambs.

To Be Culled Out

24 Ewes 20 Lambs.

Rams and Ram Lambs Sold

5 Mature Rams 6 Ram Lambs.

Horses—No change has been made in the horses during the year, therefore the same three teams have remained. The use of two teams in tandem was tried out on a gang plow for the first time this fall. Results proved very satisfactory indeed, and this arrangement helped to reduce the cost of plowing per acre really more than was expected. With two-thirds of 330 acres under cultivation there is ample work for the horses during the spring, summer and fall months.

Hogs—Three pure bred Yorkshire hogs were added to the live stock of the farm, being purchased in October at the Guelph Annual Sale. The two sows are of extra good quality. O.A.C. 3680, born March 20th, sired by Emperor O.A.C. 4th, and dam O.A.C. 3305. O.A.C. 3786, sired the same as the other sow and the dam O.A.C. 3170. The boar, O.A.C. Y-8, is of very high quality and conformation. He was sired by College Y-593 and O.A.C. 3549. This boar will undoubtedly assist greatly in improving the conformation of bacon type hogs in the district. Hogs, like sheep, are especially well thought of throughout most of Northern Ontario, and a ready market is available for all stuff produced.

FIELD HUSBANDRY

Hay Crops—As stated in last year's report, quite a large acreage was in hay land. This was reduced by fall plowing a year ago, and this year we had a total of eighty acres in hay crop, consisting of sixty acres mixed and twenty acres of alfalfa. No clover was cut for seed this year. Hay yielded a very satisfactory crop. The eighty acres, including the second cutting of alfalfa gave 106 loads or 1.76 loads per acre. The second experiment in alfalfa has proved so satisfactory that this year another twenty acres was seeded to the

same crop. The former twenty-acre field will be used for pasture during the coming summer. This is entirely a new experiment and demonstration for the farm and results are awaited with much interest. If this crop proves satisfactory for this purpose, it is the intention to use it quite extensively for pasture. One feature noted in connection with harvesting alfalfa is that it seems necessary to harvest the first crop earlier than has been the practice in the past. This is to allow the second crop to mature so that it may be cut sufficiently early in the late summer to permit satisfactory curing. It will also permit a better growth for winter conditions. Ideal weather prevailed during haying, and throughout the entire district hay of much better quality was made than a year ago.

Grain Crops—One-hundred and twenty acres were seeded to spring cereals, consisting of oats principally, barley and wheat. This area is divided up as follows:

Assalman Oats	20 acres
Victory Oats	20 "
O.A.C. No. 72 Oats	20 "
O.A.C. No. 3 Oats (about)	43 "
Alaska Oats	2 "
Barley	10 "
Mixed Grain	10 "

In addition to the above named the cereal crop for this year consisted of fifteen acres of fall wheat, Dawson's Golden Chaff, reference has already been made to the fact that cereals went into a good seed bed under favourable conditions. During the early stages of crop growth indications were that excellent crops would be harvested. These indications proved to be correct up to the time that cereals were attacked by rust. Never before in the history of the district have cereals suffered so extensively and to such an extent from the ravages of stem rust as this year. Very excellent stands of oats were reduced in yield and quality to fifty per cent. of the crop. This damage occurred in a very short time and no remedy was possible. Here and there through the district, one learns of farmers having yields of grain really equal to last year's, but this is the exception rather than the rule for 1926. No doubt it will be many more years before the district will have a re-occurrence of this thing.

On August 31st, 1925, a fifteen-acre field of Dawson's Golden Chaff was seeded and the crop cut this year was very satisfactory indeed. This crop suffered from rust which reduced the yield anticipated. Many visitors looking over the field decided that a yield of thirty bushels would be realized, twenty-six bushels per acre was the yield for the field. This year's crop of fall wheat was seeded ten days earlier and on better prepared soil, and went into winter quarters in splendid shape, in fact, the crop covered the ground like a mat and was in a very healthy condition. Many inquiries have come to hand in reference to this demonstration, and the coming fall will no doubt witness quite an increase in the acreage of fall wheat seeded throughout this section of Northern Ontario.

Seeding and harvesting dates are as follows:

Seeding Date	Kind of Grain	Harvesting Date
May 29th	Garnet Wheat	Sept. 13th
June 3th and 4th	Victory Oats	Sept. 23rd
June 4th and 5th	Assalman Oats	Sept. 17
June 8th and 9th	O.A.C. No. 72 Oats	Sept. 23rd
June 10th, 14th, 15th	O.A.C. No. 3 Oats	Sept. 8th, 9th, 14th, 15th
June 11th	Alaska Oats	Sept. 10th
June 17th	O.A.C. No. 21 Barley	Sept. 22nd

Garnet wheat was tested out for the first time under field conditions and it was most unfortunate that stem rust hit it so hard this year. It will be grown again in 1927, under field conditions and much better results are expected.

O.A.C. No. 3 Oats—Having in mind the suitability of this variety for Northern Ontario conditions it was deemed advisable to commence growing registered seed. With this end in view we communicated with the C.S.G.A., also with the Field Husbandry Department, O.A. College, Guelph. Replies to these inquiries were to the effect that no registered seed was available anywhere in the Province. It was therefore decided to secure from Professor Zavitz a small quantity of Elite Stock seed that would be pure as to kind. Professor Zavitz very kindly supplied one-half bushel, and this was seeded in a test plot. The ravages of rust, however, almost ruined the plot, so that results this year were nil from the standpoint of registration. Another attempt will be made during the coming year, as it is considered worth while in the interests of Northern Ontario agriculture.

Silage Crops—In last year's report it was stated that red clover was used for the first time as a silage crop. This was altogether a new experiment, and it was with some diffidence that results were anticipated. Expectations were fully realized when the silo was opened and feeding commenced. The silage came out in excellent condition and the live stock seemed to relish it very much indeed, in fact results were considered so satisfactory that it was decided to use red clover this year altogether. Therefore one field of red clover was set apart for this purpose and two crops were taken off it, one crop put into each silo. The second crop gave almost as great a yield as the first, Not having a platform scale it was impossible to weigh the yield per acre as the silo was being filled. Next year we hope to have data on this particular point. The small amount of labour required in the production of a crop of red clover as compared with corn or sunflowers is considered something in its favour. The use of the ordinary mower and hay rake facilitates handling very much. It possibly takes a somewhat larger acreage of red clover, but we believe the cost of the acreage required is much less than the labour cost in producing any kind of hoed crop.

A sample of the silage was sent to the Chemistry Department, O.A. College, Guelph, and the following report was received from Professor Harcourt:

Moisture	73.50	per cent.
Protein	4.90	"
Fat	1.35	"
Fibre	6.92	"
Ash	2.77	"
Carbohydrates	10.56	"

The following analysis of corn silage as taken from "Feeds and Feeding" by Henry, is of interest in comparison with the above:

Moisture	73.6	per cent.
Protein	2.7	"
Fat	.9	"
Fibre	7.8	"
Ash	2.1	"
Carbohydrates	12.9	"

Oats and peas mixed is a crop that is sometimes used for ensilage purposes and a comparison between it and the two crops already referred to is of interest. Henry quotes an analysis of oats and peas as follows:

Moisture	72.5 per cent.
Protein	3.8 "
Fat	1.3 "
Fibre	9.6 "
Ash	2.8 "
Carbohydrates	10.0 "

It will be noted from the above tables that red clover silage compared very favourably with the other crops referred to, in fact, I think it may be regarded as superior to oats and peas, in that it has a greater percentage of protein, less fibre and a slightly higher percentage of carbohydrates.

Potatoes—Lack of proper storage facilities has made it more or less impossible to carry on much work in connection with the production of potatoes. Suitable storage will be provided at the earliest convenience, after which more or less special attention will be given to potato demonstration work. Potatoes are regarded as an important crop throughout Northern Ontario, and the value of work in connection with the production of same is fully realized, Irish Cobblers, Green Mountain, Dooleys, Pioneer Pride, were all quite successfully grown this year.

Roots and Vegetables—The production of roots and vegetables throughout Northern Ontario is of very great importance. Invariably there is a splended market for stuff of this kind as well as the necessity for farmers having it for home consumption. With the provision of proper storage facilities, systematic work will be carried on from year to year in testing out different varieties, especially in reference to earliness and yield. The importance of early maturing is recognized in the production of all farm crops, along with those other qualities which tend to a satisfactory yield, quality, production, etc.

Turnips have been grown on the farm with very satisfactory results. It is just possible that the importance of early seeding has not been recognized to the extent it should have been. This one factory seems necessary in order to permit them to attain mature growth before fall weather sets in. Turnips as a hoed crop, of course, require considerable attention by way of cultivation, hoeing, thinning, etc., but it does seem that nothing will really take the place of roots as part of the winter ration for live stock. This necessitates placing them among the apparently necessary fodder crops required to make up a well balanced ration.

Experimental Work

Experimental or demonstration work was carried on only in a small way. As in the previous year, variety tests were made with cereals chiefly. The necessity for early work on the land and the seeding of field crops made it impossible to seed experimental plots at the same time. Rain came on just when we were prepared to commence work on the experimental plots and delayed seeding for about ten days. This naturally held up growth and caused the plots to be late in getting away to a start. The rod row system, in conjunction with fortieth acre plots was introduced this year and tested out for the first time. All plots showed up well in the early stages, and satisfactory yields would have undoubtedly been realized had not rust done such a great amount of damage. Wheat, oats, barley and peas were the principal crops tests out in this way, and the following tables will in part show the results obtained. Oats were so badly entangled in the rod rows that it was impossible to harvest them with any degree of accuracy. Rust weakened the stands so that they broke over and lodged in the variety beside them in the condition already referred to.

VARIETY TEST WITH SPRING WHEAT

Date of Seeding, May 29th

Variety	Date of Ripening	No. of Days Ripening	Yield of Grain per Acre
Wild Goose	Sept. 25th	119	33.95 bushels
Durum	Sept. 23rd	117	28.37 "
Quality	Sept. 24th	118	23.95 "
Reward	Sept. 15th	109	19.45 "
Marquis (selection made by Chas. Thomas)	Sept. 20th	114	13.41 "

In reference to the above table it is rather interesting to note that the Durum wheats, represented by the first three on the list suffered less from the ravages of stem rust than the other varieties. The yields realized from the Durum wheats were very satisfactory, but yields from the other varieties cannot be taken as representative of the district.

VARIETY TESTS WITH PEAS

Date of Seeding, May 13th

Variety	Date of Ripening	No. of Days Maturing	Yield of Grain per Acre
O.A.C. No. 181	Sept. 30th	122	58.30 bushels
Early Raymond	Sept. 26th	118	52.08 "
Potter	Oct. 1st	123	49.758 "
Chancellor	Sept. 30th	122	46.30 "
Canadian Beauty	Sept. 28th	120	27.80 "

The above table shows results obtained from the five highest yielding varieties, and it must be admitted that these yields were especially good. The Early Raymond variety (originated by Mr. Chas. Thomas, R.R. No. 1, New Liskeard), noted for its early maturing qualities, ripened ahead of any of the other varieties this year, although the difference in the days to mature is not very great as between the earliest and the latest. The Early Raymond gave a much greater yield than last year, the 1925 yield amounting to 26.04 bushels. It is also of interest to note that a year ago, Canadian Beauty topped the list with a yield of 42.7 bushels, while this year it yielded only 27.8. Unfavourable weather conditions during the ripening period for a late variety like the Canadian Beauty is the explanation for this difference.

Barley Selection—For the past two years definite work has been carried on in the selection of a strain of O.A.C. No. 21 barley that apparently has the characteristic of shedding its awns during the process of ripening. Results this year were quite marked and efforts will be made from year to year to definitely establish this characteristic if possible. It is sufficient to know that this year's selection gave a higher percentage of bald heads at maturity than the selection of the previous year. This would seem to indicate that we are gradually working towards the goal in mind.

Sugar Beets—In last year's report quite extensive data was given regarding an experiment with sugar beets. Thinking possibly that we might create an

earlier maturing plant, we decided to select a number of roots and produce seed this year. One very outstanding feature about this experiment is the fact that one particular root yielded one-quarter of a pound of seed and matured very much earlier than any of the other plants. Four and three-quarters pounds of seed was realized from a one-hundredth acre plot and as already noted, one plant produced itself one-quarter pound. Some of the roots failed to mature seed at all, so that no very accurate comparison can be made in this way. Results obtained from this early maturing seed already referred to will be awaited with much interest during the coming year.

Spinach Seed—During the season of 1925, working in conjunction with Professor MacLennan of Guelph, we carried on a definite experiment in connection with the production of spinach seed. Results were not determined in time to be included in the farm report for 1925, therefore it will be included this year.

Professor MacLennan sent forward sufficient seed for approximately one-twentieth of an acre. The seed was sown on June 9th and harvested September 24th. As the farm did not have any means of cleaning the seed the crop in the rough was sent forward to the Department of Horticulture to be cleaned. Sixty-five pounds of good clean commercial seed was realized. This works out to a yield of about 1,300 pounds to the acre. The variety used was Virginia Resistant and the seed came originally from the D. W. Warren Company of Norfolk, Virginia. This company was primarily looking for a location where seed might be produced, possibly more resistent than southern grown seed; also earlier in maturing. Professor MacLennan was well pleased with the experiment, and the following information received by Professor MacLennan from two firms in New York State is evidence of the suitability of northern grown seed for use by southern growers.

Jerome B. Rice Seed Co.,
Cambridge, N.Y., Sept. 2nd, 1926.

Prof. A. H. MacLennan,
Ontario Agricultural College,
Guelph, Ont.

DEAR MR. MACLENNAN:

Sometime last winter your College sent to us a sample of Virginia Resistant spinach seed of which was said to have been grown "300 miles north of Toronto."

You will be interested to know that the trial ground report made of this sample at Cambridge, checking with seed direct from Virginia, reads, "By far the earliest of the Norfolk Resistant types; was all cut and out of the way before the Virginia stock was ready for cutting."

If growing the seed in that north country begets earliness, I would advise your doing a little experimental work with the "Princess Juliana," the most popular long season variety to-day.

With kindest personal regards, I am,

Cordially yours,

(Signed) CHAS. P. GUELF.

Joseph Harris Company,
Coldwater, N.Y., Oct. 13th, 1926.

Department of Horticulture,
Ontario Agriculture College,
Guelph, Ontario, Canada.

GENTLEMEN:

You sent us a sample of Blight Resistant Savoy Spinach last spring for trial. We found it very resistant to disease and a rapid grower. Can you tell us where some seed of this strain can be obtained? We would like to get fifteen or twenty pounds for seed production.

Any information you may be kind enough to give us will be gratefully received.

Yours respectfully,

JOSEPH HARRIS COMPANY.

Alfalfa—The production of alfalfa is no longer in the experimental stage as it has been demonstrated quite satisfactory that it can be produced as an economical hay crop in the district. The following tables give yields realized from nine test plots seeded in 1924. These plots are one-hundredth acre in size, and the alfalfa was cut and dried in the ordinary way. Not having equipment to dry samples to a constant weight, it was decided to bag up the crop after having been fairly well dried in the field and store these bags inside until the alfalfa was entirely dry and take the weights. It may be considered, therefore, that the results tabulated are reliable.

Alfalfa Yield

Date of Cutting, July 19th

Plot No. 1 yielded	2 tons	981	pounds	per acre
Plot No. 2 "	2 "	993	"	"
Plot No. 3 "	2 "	1,843	"	"
Plot No. 4 "	2 "	1,531	"	"
Plot No. 5 "	2 "	1,737	"	"
Plot No. 6 "	3 "	275	"	"
Plot No. 7 "	2 "	1,706	"	"
Plot No. 8 "	2 "	1,500	"	"
Plot No. 9 "	2 "	1,062	"	"

Average yield per acre—2 tons 213 pounds.

Date of Cutting, September 15th

Plot No. 1 yielded	2 tons	787	pounds	per acre
Plot No. 2 "	1 "	1,087	"	"
Plot No. 3 "	2 "	337	"	"
Plot No. 4 "	2 "	156	"	"
Plot No. 5 "	2 "	381	"	"
Plot No. 6 "	2 "	218	"	"
Plot No. 7 "	2 "	912	"	"
Plot No. 8 "	2 "	712	"	"
Plot No. 9 "	2 "	575	"	"

Average yield per acre—2 tons 351 pounds.

It may be noted from the above tables that the average return per acre, including both cuts and from all the plots, amounted to 4 tons and 564 pounds.

Plots of mixed timothy, red clover and alsike, eight in all, one-hundredth of an acre in size, harvest, August 10th, gave the following yields:

Mixed Timothy Yield

Plot No. 1 yielded	2 tons	1,675	pounds	per acre
Plot No. 2 "	2 "	1,812	"	"
Plot No. 3 "	2 "	1,193	"	"
Plot No. 4 "	2 "	550	"	"
Plot No. 5 "	2 "	1,318	"	"
Plot No. 6 "	2 "	1,325	"	"
Plot No. 7 "	2 "	575	"	"
Plot No. 8 "	3 "	1,068	"	"

Average yield per acre—2 tons and 689 pounds.

In order to check up on field production, three plots, one rod square were taken from three different places in a field of timothy with the following results:

TIMOTHY YIELD

Date of Cutting, June 27th

Plot No. 1 yielded	1 ton	1,097	pounds per acre
Plot No. 2 "	1 "	771	" "
Plot No. 3 "		1,481	" "

This worked out to an average of one ton and 477 pounds per acre. The above consisted of almost pure timothy, as the previous year the field had been a mixture of clover and timothy.

Buildings.

The implement shed and milk room which were in course of erection at the time last year's report was issued, were duly completed and were found to be very useful. A small farm work shop has been established in one end of the implement shed and serves a very useful purpose in connection with general farm repair work, etc. During the early summer these buildings were painted to correspond with the other farm buildings.

Roadways.

Very little new work was done during the year in this connection, except that through the kindness of the Northern Development Branch, the main lane through the farm was graded up in excellent condition. Plans were under way to have the lane gravelled but the pressure of fall work and the earliness with which winter set in prevented these plans being carried out.

General Improvements.

The cleaning up programme commenced a year ago was pretty well completed with year, so that the farm yards, etc., present a more pleasing appearance. Further improvements are now being considered, especially landscape work. It is the intention to establish a permanent driveway around the buildings and then commence in a small way, tree, shrub and flower planting. Further work has been done in clearing up the different roots which come to the surface with each year's cultivation. Very little more work in this connection should rid the farm altogether of small roots and sticks.

As the farm yard is quite flat and drainage more or less unsatisfactory it was decided this fall to tile drain the entire yard. This work was surveyed and tile installed, and when the yard has been filled with stone and gravel it should be in first class shape. This work, of course, is quite permanent in nature and will last for many years to come.

Extension and Publicity.

Many farmers and others interested have visited the farm during the year, the majority being interested in the various lines of live stock and in other things. The demonstration with fall wheat also attracted quite a number of visitors and many favourable comments were heard.

The Annual Spring Seed Fair and Short Course held at New Liskeard used the farm stock for purposes of demonstration and a few classes were held at the farm during the course. During the summer months the Junior Farmers' Association from the vicinity of Englehart, visited the farm and an educational programme was arranged for the day. Mr. McNaughton, Vice-Chairman of the Overseas Settlement Committee, from London, England, was a visitor to the farm in the early fall. He was at that time just completing a survey of Northern Ontario and desired to look over the Demonstration Farm in order to view the crops, in particular. The Temiskaming Plowmen's Association held its third annual plowing match on the farm on the 29th day of September.

Reference has already been made to the extension work with Boys' Sheep Clubs, and much interest is anticipated in this particular line of work. The farm staff has co-operated in every way possible in extension work throughout the district in connection with meetings of different kinds, fall fairs, etc. Every consideration was given to the tour of the Demonstration Seed Cleaning Train and the farm along with certain farmers in the vicinity provided the necessary seed for the demonstration at New Liskeard.

Summary

Agricultural conditions throughout this section of Northern Ontario, this year (1926) compare quite favourably with other years except for one or two things. First, the large amount of damage done by stem rust reduced the cereal crop very much in yield and quality. 1925 harvested one of the best cereal crops in the history of the district, therefore it was disappointing that so splendid a stand of grain should be so badly damaged by rust. It is not expected that there will be a reoccurrence of this thing for many years to come. The loss sustained due to a partial failure of the oat crop was very largely, if not altogether, made up from the splendid crop of clover seed harvested and the very excellent returns received from same. Twelve carloads of clover seed were shipped from New Liskeard alone; others from different points along the line of the T. & N.O. These twelve carloads averaged $8,000.00 per car, which meant a very nice return to the farmers of the district. To individual farmers, returns varied from two or three hundred dollars up to as high as seven thousand dollars.

The potato crop was also very satisfactory. There being really no damage from rot or decay though yields were slightly below the average in some sections. Here, again, the price paid for potatoes was above the average, some farmers selling from the field in the fall at $1.50 per bag, while the late fall prices went to $2.00.

The live stock industry, dairying in particular, has increased during the year, and farmers are realizing more than ever before the importance of a steady return from this industry. Sheep and hogs have also increased in numbers and there have been many inquiries at the farm for ewes.

Reference has already been made to the use of red clover for ensilage purposes, and results have been most encouraging.

The pea canning factory recently established had quite a successful year though some farmers suffered some loss in this crop due to excessive moisture in the early part of the season.

The production of barley increased very much during the year, the acreage per farmer ranging from 5 to 100 acres. Barley is used quite extensively by all farmers for live stock feeding.

The problem of marketing has been very well taken care of during the year. The various lumbering camps and mining towns along with construction camps here and there provide quite a splendid market for finished products.

Unlike most of the Province this section of Northern Ontario had quite a dry summer and fall, in fact, pastures never before were as slack as during this year. Clovers being more or less native to Northern Ontario helped out very materially in pasture.

Quite a number of inquiries were received during the year from prospective settlers, and a number of new settlers came into the district, settling either on homestead land or purchasing farms.

The development of Northern Ontario agriculture is progressing very favourably, and it is the desire of the farm staff to have the farm function in such a way that real practical results may be handed out to the men on the land, who are doing so much to develop this great new country.

Ontario Department of Agriculture

FIFTY-SECOND ANNUAL REPORT

OF THE

Ontario Agricultural College

AND

Experimental Farm

1926

PRINTED BY ORDER OF

HON. J. S. MARTIN, MINISTER OF AGRICULTURE

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

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Ontario Agricultural College
and Experimental Farm
1926

To the Honourable the Minister of Agriculture:

SIR,—I beg to submit herewith my Seventh Annual Report as President of the Ontario Agricultural College.

Satisfactory conditions continue in all departments of the college. While the established work of the college in resident teaching has received its due attention, outside teaching, or extension, in all its forms, has been rapidly expanding, as indicated by the report of the Director of Extension. At the same time, the third department of college interest—experiment and research—has advanced greatly under the impulse of new encouragements.

The long-established and widely known experimental branch of the Field Husbandry department continues the careful, accurate tests of varieties, and is enlarging its work in plant breeding. Dr. Zavitz has just handed in for publication a circular enumerating the superior qualities of new strains of field crops that have been produced on the experimental plots at the college.

There are at the present time, ten of the college staff, temporary and permanent, listed under "Research," besides three in the Field Husbandry Department who devote most or all of their time to experiment station work. Four of the ten are in Chemistry,—one employed in routine analysis, one in flour testing, and two in soil surveys. Four are employed in Agricultural Economics,—in marketing, cost accounting, and farm management investigations. One is listed under research in horticulture, and one under poultry, Some of these also teach their special subjects in the regular classes when required.

Investigation or research, however, is not limited to those departments which are provided with research assistants. Much of the investigation conducted by the college is suggested by farm conditions as they arise, or by inquiries received. Thus the Department of Physics has investigated the efficiency of lightning rods. The Department of Chemistry has been, and still is, investigating the question of renovating depleted soils. The Department of Botany is continually investigating the control of weeds. The bacteriologists are being required to make numerous tests of farm water supply. For some years now the Department of Entomology has been working on the very serious problem of the cornborer.

The Department of Animal Husbandry has been investigating the problems of economical feeding of animals. In poultry, recent investigations have been conducted on the feeding of poultry in relation to rearing the young, in the light of present day biological and chemical science. New problems in the care of milk and the manufacture of butter and cheese are constantly engaging the attention of the Dairy Department. Economic problems of farm management and marketing require the continued attention of members of the Department of Agricultural Economics. The Department of Horticulture is testing strains of fruit and vegetables, in the hope of finding, either by selection or breeding, some strains of superior quality. The Department of Apiculture is doing some investigation on queen rearing and the treatment of combs for the eradication of American Foul Brood.

The opportune decision of the Ontario Government to grant scholarships in aid of agricultural research has enabled two departments to commence special investigations on problems of great practical importance. In the Poultry Department. Mr. Jack has been investigating questions of nutrition. In the Animal Husbandry Department, work has just been commenced on the winter rearing of pigs. These scholarships will undoubtedly assist in solving some important practical problems. Another consequence of great importance will be the encouragement of the spirit of study and research among both our undergraduates and our graduates.

For the promotion of graduate study and research in the college, a committee on graduate studies has been formed under the direction of the School of Graduate Studies in the University of Toronto. The committee consists of six members from the School of Graduate Studies, and six from the Agricultural College. The work of this committee has created a new understanding between the College and the University.

Convocation

On May 28th, 1926, a special Convocation for the conferring of degrees in agriculture was held at the college. Higherto, candidates for degrees in agriculture had received their degrees at the General Convocation held at the University. The opinion was generally expressed that the affair was a success. The gathering was distinguished by the presence of the Minister of Agriculture, the President of the University, the Chancellor, and of several members of the University Senate, as well as many friends of the graduating class. The occasion did much to further a proper understanding of the importance of agricultural science and of scientific agriculture among the members of the Senate, many of whom were then visiting the college for the first time.

Trent Institute

For several years the College, through the Department of Chemistry, has been co-operating with the millers and bakers by making practical tests in milling wheat and baking flour. Out of this co-operation grew the flour-testing laboratory. Associations of millers and bakers began to hold their meetings at the college. Two years ago a two-weeks short course on the science and practice of modern bakery was held here, and the course was repeated the next year.

In the mind of Mr. H. E. Trent, Secretary of the Bread and Cake Bakers of Canada, there grew the idea, generated by his frequent associations with the college, of a Baking School at the Ontario Agricultural College. The short courses in baking were his idea, as an experiment to test the demand and the need for such an opportunity. His purpose finally took shape as a gift to the college, from the baking and allied trades, of a fine building, completely equipped and furnished for giving instruction and conducting research in milling and baking. This building has been fittingly named the Trent Institute, and will be ready in January for the first three months' course.

Sick Leave

It is much to be regretted that two highly-esteemed members of the College staff are unable at present to continue their work. Some months ago, Professor Evans underwent a serious operation, and he has not yet recovered. Mr. Kendall, with the assistance of Mr. Webb, is carrying on the work in Farm Mechanics satisfactorily.

Dr. Zavitz has again asked for leave of absence, and on November 15th he started for Florida, in the hope that the mild winter climate there would, as before, enable him to regain a satisfactory degree of health and strength. Professor Squirrel is acting head of the department, and with a strong and efficient staff to support him, the work of teaching is being carried on without extra assistance.

INTER-RELATIONS

It is with great satisfaction that I report the pleasant relations that exist in the College, as well as between the College and other organizations with which the College has most to do. Among the members of the staff, and between the staff and the students, a cordial co-operative spirit prevails.

The various branches of your own department are with increasing frequency making use of the resources of the College, not only for accommodation, but also for conference and for instruction. I wish to take this opportunity of recording the uniformly high value of the work done by the Agricultural Representatives, a body of men with whom the College comes constantly in contact, and whose services in their respective counties are universally well spoken of.

The understanding and interest that you personally have shown in all departments of the College, and the generous financial support that you have secured for new as well as for established enterprises, are fully appreciated. The Deputy Minister has shown himself at all times to be familiar with the needs of the College, and ready to assist in securing recognition of those needs.

The co-operation of the College with the Department of Education, in conducting the summer school for teachers, is bearing fruit in the extension of the teaching of agriculture in a widening circle of public schools. Children of public school age have to be shown that farming is interesting, and that they themselves can be interested by doing interesting things. That point of view is what the teachers attain to in their summer course here.

The joint committee on graduate studies in agriculture, between the College and the University, has already been mentioned. The meetings of the committee, have been productive of an increased intimacy among the personnel of the two institutions, and the establishment of a cordial co-operation in agricultural research.

A brief report follows of the year's work in each of the College Departments.

Respectfully submitted,

J. B. REYNOLDS,
President.

COLLEGE ATTENDANCE

The figures for the General Course show only a very slight increase. This is due largely to the fact of the small first year class in 1923 and 1924. Our first year classes since then having increased considerably.

Our Winter Short Courses show an increase of 27% from last year, the greatest increase being in the Dairy, Horticulture and Agriculture courses. A slight decrease is shown in the courses in Stock and Seed Judging and Farm Power. The course in Stock and Seed Judging would be most affected by the Short Courses held throughout the country by Agricultural Representatives.

The figures for Macdonald Institute remain about the same. This, of course, is due to the fact that it is accommodating the maximum number of students possible.

The figures for the Girls Conference are slightly lower.

The Summer School attendance has increased for the past two years. Probably the effect of the withdrawal of the Government Grant for fees has worn off, and this course is returning to its normal size.

The number of students from other provinces of the Dominion and from other countries remains about the same.

The average age is twenty-two years. This figure has remained constant since the age for admission was raised to eighteen years.

The following are the figures for attendance in each course held throughout the year:

(Figures for general courses include students of winter term and new students of fall term.)

General Course	307	
Specialists in General Course Work	5	
Dairy Courses	213	
Stock and Seed Judging	67	
Poultry Raising	46	
Horticulture	152	
Apiculture	79	
Drainage and Drainage Surveying	4	
Farm Power	43	
Spraying	35	
Short Course for English Immigrant Boys	28	
		879
Domestic Science (at Macdonald Institute)		408
Girls' Conference (Junior Women's Institute)		214
Summer Courses:		
High School Teachers—1st year, 32; 2nd year, 35	67	
Public School Teachers—1st year 74; 2nd year, 64	138	
		205
Total		1,706

Analysis of College Roll (General Course), 1926

From Ontario

Brant	10	Leeds	2	Rainy River	1
Bruce	6	Lennox & Addington	1	Renfrew	1
Carleton	19	Lincoln	14	Russell	1
Durham	2	Middlesex	12	Simcoe	7
Elgin	6	Muskoka	2	Stormont	1
Essex	6	Nipissing	1	Temiskaming	1
Glengarry	2	Northumberland	2	Thunder Bay	6
Grenville	4	Norfolk	3	Victoria	1
Grey	5	Ontario	1	Waterloo	5
Haldimand	3	Oxford	11	Welland	5
Halton	6	Parry Sound	2	Wellington	28
Hastings	5	Peel	4	Wentworth	14
Huron	6	Peterboro	3	York	23
Kent	5	Perth	5		
Lambton	8				
Lanark	5	Prince Edward	2	Total from Ontario	257

From Other Provinces of the Dominion

Alberta	3	Nova Scotia	7	Saskatchewan	3
British Columbia	8	Quebec	2		
Manitoba	1	Prince Edward Island	2	Total from other Provinces	28

From Other Countries

China	1	Ireland	1	Spain	1
Cuba	1	Jamaica	2	U.S.A.	2
England	11	Newfoundland	1		
India	1	South Africa	1	Total from other Countries	22
				Total	307

Age and Religious Denominations

The limits of age in the General Course, 1926, ranged from 18 years to 36 years. The average age was 22.

Religious denominations of students registered for the fall term were:

Anglican	75	Jewish	1	Roman Catholic	8
Baptist	23	Lutheran	1	United Church	152
Disciples of Christ	1	Mennonite	1		
Greek Orthodox	2	Presbyterian	43		

Degrees and Diplomas in Agriculture

The following students graduated in 1926 with the degree of Bachelor of the Science of Agriculture (B.S.A.).

Agricultural Option

(Agronomy Division)

Kennedy, A. H., Guelph.
Lang, J. M. S., Surrey England.
MacLeod, H. A., Uigg, P.E.I.
Whitmore, J. E., Ottawa.

(Animal Husbandry Division)

Cruickshank, G. Y., Simcoe.
Hannam, H. H., Toronto.
Knox, H. A., Toronto.
McEwan, J. W. G., Melfort, Sask.
McGugan, A., Essex.
Richardson, F., O.A.C.
Simpson, J. A., Toronto.
Stewart, F. K. B., Newmarket.
Young, W. A., Toronto.

Apiculture Option

Le Maistre, W. G., Guelph.
Pugh, R. M., Ithaca, N.Y.

Chemistry Option

Lemieux, O. A., Guelph.
Mackinney, G., Toronto.

Dairy Option

Lewis, F. O., St. Thomas.
MacArthur, H. A., Martintown.
Medd, A. B., Exeter.
Miller, H. E., Windsor, Jct., N.S.
Miller, W. C., Guelph.
Morton, M. J., Guelph.
Reid, C. G. L., Elmira.
Wharry, J. G., Pittsburg, Pa.

Entomology Option

Elton, V. T., Toronto.

Horticulture Option

Fisher, W. C., Queenston.
Hawkins, R. T., Stayner.
Kemp, W. L., Guelph.
Reynolds, W. B., Port Hope.
Roxburgh, J. M., Cache Bay.
Schenck, L. M., St. Catharines.
Webb, E. G., Guelph.
Kendall, E. W., Guelph.

RECIPIENTS OF ASSOCIATE DIPLOMAS, 1926

R. C. Banbury, Salford.
H. T. Becking, Holyrood.
C. E. Christie, Victoria, B.C.
J. A. Charlton, Paris.
F. Q. Dench, Lakefield.
C. Grigg, Roseneath.
B. S. Hill, Queensville.
C. E. Misener, Smithville.
F. D. Sawyer, Guelph.
J. C. Shearer, Bright.
E. L. Way, Picton.
G. B. Whiteside, Atwood.

MEDALS, SCHOLARSHIPS AND PRIZES AWARDED, APRIL, 1926

1905 Scholarship

$50 in cash awarded by a Committee of '05 graduates at the college to the best "all round" man at the close of his third year—G. E. Thompson, Belmont.

Governor-General's Silver Medal

For general proficiency, first and second year work—G. J. Ferguson, Clinton.

George Chapman Scholarship

$20 in cash for proficiency in English (Degree Course), first and second years—J. H. Johnson, Hamilton.

Second Year Special Essay

$10 in cash—B. S. Hill, Queensville.

General Proficiency Prize

$10 in cash—G. J. Ferguson, Clinton.

Farmer's Advocate Scholarship

General proficiency in Animal Husbandry and Field Husbandry, first and second year, (Associate Course)—J. C. Shearer, Bright.

Fourth Year

$10 in cash to the student ranking highest in general proficiency, and obtaining first class honours in his major subjects—G. Mackinney, Croyden, England.

SCHOLARSHIPS OF $20 EACH AWARDED FOR PROFICIENCY IN GROUPS OF SUBJECTS AS OUTLINED IN THE CALENDAR—FIRST YEAR

Associate

Group 1—V. R. Brown, Harley.
Group 2—E. H. Ellis, Dorion.
Group 3—R. W. Lapp, Toronto.
Group 4—A. N. L. Butler, Ottawa.

Degree

Group 1—L. A. Birk, Dashwood.
Group 2—W. M. Gammon, Forest.
Group 3—J. F. Sykes, Paris.
Group 4—W. R. Graham, Guelph.

PROFESSIONAL DAIRY SCHOOL CERTIFICATES ISSUED DURING 1926

Butter

Bradley, P. A., Harriston.
Deveau, Neil, Middleton, N.S.
Fisher, J. M., Mindemoya.
Graham, W. A., Alexandria.
Greer, F. G., Cleveland, Ohio.
Hartwick, J. M., St. George.
Hilderley, E. J., Stratford.
Klinkman, W. P., New Hamburg.
Laidlaw, J. R., Paisley.
McCabe, M. E., Centralia.
Reece, N. C., Silverdale.
Reeves, F., Stellarton, N.S.
Rogers, W. E., Swift Current, Sask.
Such, J. S., Brigden.
Wilson, L. M., Galt.
Young, R. H., Lindsay.

Cheese

Bain, J.M., Lakeside.
Leslie, F., Ingersoll.
Northrup, O. V., Collina, N.B.

WORK IN THE DEPARTMENT

ENGLISH

During the year no important changes have taken place either in the staff or in the organization of work in the Department of English. Our courses as in previous years include English and Canadian literature, Composition, Journalism and Public Speaking. We have, however, during the past two years extended our course in English Literature to include modern authors, and each fourth year student is required to make a special study of one or more writers of the present day.

During the present year also, we are making a special effort to direct the outside reading of the students. Most of the students read, in their spare time, one or two books a month, and we are trying to see that they choose books of the better class.

In the winter term of the present year, this college became a member of the Intercollegiate Debating Union. The subject debated last year was Proportional Representation. The teams from the O.A.C., under the direction of Professor Unwin, were winners of their group—which consisted of McMaster, Western and O.A.C.; and were runners up in the final debates with the winners of the other groups. The college and those who took part in the debates are to be congratulated on their success.

During the year Professor Unwin and Mr. McLean have completed a new bulletin on public speaking. It will be printed in the spring, so that it will be ready for distribution early next fall.

In addition to the regular work, Professor Unwin, Mr. McLean and Dr. Stevenson have from time to time been called upon to judge debates and public speaking contests in different parts of the province and we have also given a number of extension lectures.

During the fall term an Extension Class in English Literature has been organized at the college for members of the staff and their wives and friends. This class is conducted by Dr. Stevenson and has been largely attended. A number of nineteenth century poems are being studied, including Tintern Abbey, The Holy Grail, Balder Dead, The Hound of Heaven, and others; and lantern slides illustrating the lives and works of the authors are shown.

These are the only special features of the work during the year. The chief part of the work in English is, of course, carried on in the lecture room.

BACTERIOLOGY

The demand for legume bacterial cultures by the farmers of the Province, this year, more than doubled that of any former year. The preparation and despatching of these cultures necessitated much overtime work on the part of several members of the staff.

The numbers of these cultures sent out were as follows:

For inoculating	alfalfa seed	10,861
" "	sweet clover seed	1,617
" "	red clover "	621
" "	alsike clover "	204
" "	field beans "	67
" "	field peas "	410
" "	soy beans "	190
" "	vetches "	22
" "	sweet peas "	46
" "	white clover "	15
		14,053
Cultures returned by Agricultural Representatives		497
		13,556

Lactic Cultures Prepared and Sent Out.

Escherichia acidi lactici	216
Lactobacillus bulgaricus	27
Lactobacillus acidophilus	12
Total	255

Our examination of creamery butter samples for yeast and mould content was continued throughout the summer at the request of Mr. George H. Barr, the Director of Dairying for the Province. Over 12,000 samples were examined and reported on. This work helps to check up conditions prevailing in the creameries, and is much appreciated by those concerned.

Samples of farm well water received for bacteriological analysis, numbered 114. Over 80 per cent. of these samples were condemned as being unfit for drinking purposes unless previously treated.

Various samples of milk, soil, food substances and pathological specimens of plants and animals, were received for examination and reported on.

BOTANY

In addition to the regular academic work and correspondence of the Department, the following investigation and extension work was carried on during the past year:

Spray Service in the Province of Ontario.

Special investigations into the plant disease problems of the Essex Peninsula.

Experiments concerning the effects of various seed disinfectants in the control of cereal smuts.

Experiments in the prevention of rhizoctonia or black scurf of potatoes.

Investigations concerning the strains of canning peas resistant to root rot and experiments for the control of this disease.

Experiments for the control of onion smut.

A Uniform Rust Nursery conducted in co-operation with the Office of Cereal Investigation, United States Department of Agriculture, Washington, D.C.

Co-operative experiments in weed eradication.

Experiments in co-operation with the Department of Entomology to determine whether financial gains are to be secured from spraying commercial vineyards for the control of insects and fungus diseases and to determine the time and number of applications for best results.

Purity tests of clover and grass seed for farmers and seedsmen.

Orchard Spray Service

All of the members of this Department co-operated with the fruit branch in carrying out the spray service in apple orchards throughout the Province. Mr. Evans of this Department had charge of this work in Huron County. He reports that applications for supervision of orchards increased from fifteen in 1925, to twenty-nine in 1926. The orchards were located in eight townships and represented varying conditions ranging from north to south, a distance of over forty miles. The season was a very difficult one in which to secure good results from spraying. Wet weather prevailed throughout most of the growing season, making necessary a post calyx application as well as one late in August. The results, however, were on the whole satisfactory. Those men who thor-

oughly sprayed their orchards at the times advised, secured from ninety to ninety-eight per cent. clean fruit, while in unsprayed orchards throughout the County, many varieties of apples were one hundred per cent scabby.

Special Investigations into the Plant Disease Problems of the Essex Peninsula

These were carried on at the Ridgetown Experiment Station by Mr. Sands of this Department. They included work with beans for the selection of varieties resistant to Mosaic and Anthracnose, experiments with various chemicals for the prevention of onion smut, spraying and dusting celery for the control of blight, inspection of raspberry plantations throughout Essex, Kent and Lambton counties for the purpose of locating plantations practically free from Mosaic and Leaf Curl from which certified disease free stock might be obtained and experiments concerning the effects of various seed disinfectants in the control of cereal smuts.

Investigations Concerning Root Rot of Canning Peas

This work has been carried on by Dr. Stone of this Department.

The highly resistant variety, Horal, has been introduced into the Province and is now being quite widely grown in sections where root rot has been troublesome. Field trials have shown the following varieties of canning peas to be highly resistant to root rot: Horal, Rice's 330, Yellow Admiral and certain selections as F,H.B,C,D,G. These selections are of the Alaska type.

The less resistant varieties of canning peas are: Alcross, Surprise, Advancer, Lincoln and Rice's 13.

The varieties of canning peas which have been found to be very susceptible to root rot are: Roger's Winners, Alaska, Late Alaska, Double Alaska, Horesford, Hustler, Badger, Early Sweet, First Earlies, Extra Earlies, Perfection, Thomas Laxton, Glory Amier.

In connection with the investigational work with root rot of canning peas greenhouse trials were made to determine the effect of various seed disinfectants in the prevention of this disease. The following seed disinfectants were tested: Formaldehyde (seed sprayed and soaked), Copper Carbonate Dust, Uspulum, Semesan, Corrosive Sublimate.

In no case did seed disinfectant prevent the development of root rot.

Trials were also made to determine whether the addition of certain chemical substances to the soil would have any effect in preventing root rot. The following stances were tried: Lime, potassium chloride, acid phosphate, ashes, complete fertilizer.

None of these substances appeared to have any effect in preventing the development of the disease.

Uniform Rust Nursery

A uniform rust nursery was conducted again this year in co-operation with the Office of Cereal Investigation, United States Department of Agriculture, Washington, D.C. Similar nurseries are located throughout the Dominion of Canada and the United States. The object of these nurseries is to locate the distribution of the prevalent biologic strains of rust of wheat and oats throughout the Dominion of Canada and the United States.

Co-operative Experiments in Weed Eradication

The results of these experiments are published each year in the Annual Report of the Ontario Agricultural and Experimental Union and it would be but duplication to include them in this report. It should be mentioned, however, that over one hundred farmers have co-operated in this work and helped to secure information concerning the suppression of many of the worst weeds of the Province.

The correspondence of the Department was considerably increased this fall by the interest shown by the general public in wild mushrooms. During September and October, many hundreds of specimens were sent to the Department for identification. Most of the specimens received were edible but among them were found the followiug deadly poisonous species: Fly Agaric (Amanita muscaria) Deadly Agaric (Amanita phalloides), Destroying Angel (Amanita verna).

One man submitted for identification fourteen quarts of the Destroying Angel (Amanita verna). In all cases where mushrooms were sent in for identification they were named and their qualities described. If poisonous mushrooms were submitted special attention was called to the individual characters of the species, and the fallacy of the popular tests for identifying poisonous and edible mushrooms pointed out.

CHEMISTRY

In addition to the regular class work and the chemical examination of hundreds of samples of miscellaneous materials for correspondents, a great deal of experimental and investigational work has been accomplished.

This year, owing to the special interest in the growing of tobacco, the soil survey work was confined to the tobacco growing district and especially to Norfolk county. Special interest was manifested in the soils suitable for growing flue-cured tobacco.

The work on the demonstration plots at Welland and Simcoe is being continued and some very instructive results regarding the use of lime and potash are being collected. Through the Canadian Canners' contribution to the work, we have been able to continue the experimental study of the fertilizer requirements of such canning crops as peas, corn and tomatoes. The Dominion Sugar Co. have assisted in the same kind of a study of the requirements of sugar beets, beans and potatoes.

The study of the fertilizer requirements of the potato crop has been continued for six years, and there now are sufficient data to warrant publishing the results.

During the year, three bulletins were published. No. 313, Soil Acidity and Liming; No. 321, Lime and Phosphate, which deals with the results obtained from three farms in each of twenty-four counties of the use of phosphates in the wheat crop and lime on clover, and No. 322, Soils and Fertilizers, which treats of the maintenance of soil fertility by the use of manures, green manures and fertilizers.

Investigational studies are being carried on in connection with the influence of straw on the biological changes of the soil when used as manure. Indications point to the conclusion that organic matter up to two or three tons per acre is without injurious action.

The problem of orchard fertilization with the recently introduced nitrogenous fertilizers is being considered as well. Fall and spring applications are compared and an attempt is being made to determine the relative values of the different sources of nitrogen.

Laboratory investigations are constantly carried on to determine the residual effects of the different soil treatments used on the outlying experimental fields. This work alone entails an enormous amount of effort.

Beside the above projects which are the most important, work has been begun on the manufacture of artificial manure, heating hotbeds with straw, golf green fertilization and other.

One division of the work which requires a great deal of time, is the examination of the several hundred samples of soil which are sent in by farmers for examination and advice. This takes on an average from a half to a full day per week during the summer season, and is one which has proven of great value to the farmers of the province.

Assistance has been given to the dairyman with his many and difficult problems. Professor Gibson spent the greater part of the year in England perfecting his knowledge of the chemical and biological properties of milk and in particular conducting practical studies of the vitamine of milk under different methods of handling. It is hoped to continue the work here this year. The following paragraph indicates the nature of the work Mr. Gibson did while away on leave of absence.

"During my "leave of absence" occupying the winter term and summer recess of 1926, I made a study of the food accessory work which is being carried on at the University of London, Lister Institute and The National Institute for Research in Dairying in England. The latter institute gave me facilities for doing personal research into the vitamin content of butter produced from different systems of cattle feeding. A remarkable difference in vitamin A and antirachitic vitamin content was found to exist in various samples of butter. Through ultraviolet irradiation of butter under suitable conditions, I was able to create an antirachitic property in butter low in this vitamin. The work was very interesting and showed possibilities of valuable application to dairying and agriculture in general. I trust that facilities may soon be established at the O.A.C. to continue this important study. My thanks are specially due to Dr. J. C. Drummond of London University, Dr. S. S. Zilva of the Lister Institute and The National Institute for Reaserch in Dairying for their valuable assistance and kindness throughout my studies."

Trent Institute, the building erected and equipped by the Bread and Cake Bakers' Association and the Allied Trades as a school for bakers, is now ready for use and it is expected that the first class commence work the beginning of the year.

The equipment of our commercial flour testing was moved to the Trent Institute during the summer, and consequently the work was held up for a time, but the laboratory has been very busy this fall.

We have co-operated with the other departments of the college in studying the composition of fodder plants, root crops, the newer materials being used as insecticides and fungicides and other materials which have come to the department from time to time.

ENTOMOLOGY

The following is a summary of the work of this department during the year 1926.

1. Teaching in the regular and short courses.
2. Conducting correspondence.
3. Adding to and classifying the department's collection of Ontario insects.

4. Experimental and research work on—
   (a) The European corn borer.
   (b) The striped cucumber beetle.
   (c) Household insects.
   (d) The turnip aphid.
   (e) The onion maggot.
   (f) Insects troublesome to golf greens.
5. Writing of pamphlets and papers on entomological subjects.
6. Extension work as follows:—
   (a) Training by lectures, demonstration and orchard practice the supervisors of the Spray Service for the Province.
   (b) General supervision of the Service with the assistance of the Professor of Botany. One member of the staff acted as local supervisor for Brant county.
   (c) Addressing county councils re appointment of inspectors under the Corn Borer Act.
   (d) Training the individual inspectors appointed under the Corn Borer Act and supervision of their work.
   (e) The general supervision of nursery inspection.
   (f) Training the new Provincial Fruit Pest Inspector in his duties.
   (g) Writing timely letters for the press on various insect pests.
   (h) Giving public addresses to fruit growers, bakers, Rotary Kiwani and Nature Study clubs.

PHYSICS

During the year 1926, the department, while continuing and strengthening the courses of instruction for its regular students, has increased its other activities and broadened its field of influence as follows:—

Circular 46—The Septic Tank—was prepared and published. There has been a greatly increased demand for information since the pamphlet, rather than the bulletin form, has been adopted, Work on 3—chamber tanks has been initiated.

Two "simplified plumbing" installations have been completed by a skilled plumber under the supervision of the department, and useful information has been collected which will shortly be published in Bulletin 267 (Revised edition).

Equipment to demonstrate the use of windmills for operating compression and open tank systems is being installed in the farm engineering laboratory.

Demonstrations in the use of explosives, and practical assistance in land clearing, have been given this year for the first time.

The department is prepared to give practival assistance in connection with any or all of the following branches of agricultural engineering:—

1. Hydraulic rams (installation and operation.)
2. Sewage disposal plants.
3. Drainage surveys, tile underdrainage.
4. Fresh water supply systems.
5. Ice-house instruction and ventilation.

Information relative to any other branches of agricultural engineering will be given upon request.

AGRICULTURAL ECONOMICS

On the instructional side of the work of the department, progress was made in revising the courses in Political Economy to make them more efficient as foundational or background work for the applied courses in Marketing and Farm Management. A course in Rural Sociology for Associate students was prepared and introduced during the year.

This year marks the completion of the largest volume of research work on a variety of economic problems of Ontario Agriculture that this department has yet attempted. The ground thus covered is partially indicated by the following list of publications issued during the year.

(*a*) The Marketing of Fluid Milk in Ontario.

(*b*) Marketing Ontario Tobacco.

(*c*) Tobacco farming in South Western Ontario involving a survey of 230 Tobacco Farms.

(*d*) Cost of Making Creamery Butter in Ontario.

In addition the department inaugurated a comprehensive study of the revisions in farm practises that will inevitably be caused by the ravages of the Corn Borer in South Western Ontario. This present demands a practical determination of the crops that may profitably be substituted for corn in this area. This problem involves an examination of the following economic phases:—

(*a*) The contraction in corn acreage to meet obligatory clean-up measures.

(*b*) The marketing possibilities of possible substitute crops; tobacco, sugar beets, and canning crops.

(*c*) The labour resources, actual and potential, for the changed farm methods and practises.

(*d*) The possible modifications in livestock production and in common farm crops not directly affected by the borer.

A survey of 600 farms to procure essential data on sections (*a*) and (*d*) above has been completed and the other sections of the study are so rapidly nearing completion that a report will be issued early in the new year.

The past year has been characterized by the loss of three valuable members of the staff. Professor Colquette, who was in charge of Marketing Research, returned to the field of Agricultural Journalism, Mr. E. E. Reilly, who carried the major part of instruction in Political Economy and Statistical Method, joined the Department of Economics at the University of Western Ontario, and Mr. G. W. Michael, Chief Field Supervisor in Farm Management Research is now farming on his own account.

ANIMAL HUSBANDRY AND FARM

The summer of 1926 was one of the wettest on record and all crops suffered as a consequence. Alfalfa winter killed to some extent and hay was only a fair crop. Spring grains were scarcely up to average and oats rusted badly. Corn was a good crop, though late, and mangels produced abundantly. Turnips yielded only about 50 per cent. of a full crop due to the ravages of aphis and the excessive moisture. A nicotine dust spray was tried on eight acres of turnips and successfully killed the aphis at a cost of $10.50 per acre for material. All crops were successfully harvested and fall plowing completed.

No horses were purchased during the year. Two Percheron foals, were raised. Work on horse maintenance costs was continued.

The beef cattle herd was maintained at a high standard throughout the year and a new sire was purchased at $675 to head the Shorthorn herd. Herd maintenance cost records were continued.

The dairy herd continues to improve and the average quality of the lot is of a high order. In addition to records on production and rearing costs some valuable work on veal calf costs was carried through. All cattle in both the dairy and beef barns were entered in the Federal accredited herd system and passed a clean test in July.

Never have the sheep produced more or better lambs. Eight breeds were maintained for class-room purposes.

It was a great year for hogs. Prices remained firm and returns from the large herd of hogs broke all previous records. Chief among a number of experiments under way is an *investigation into the causes of losses in cold-weather litters.* A university graduate in biology is working on the problem.

During the year, bulletin 299 on The Bacon Hog was revised and published as bulletin 320. Bulletin 274 on sheep was also brought up to date.

The annual sale of surplus stock drew a record crowd and, considering conditions, was a great success totalling over $9,000. Hogs and dairy cattle were in keenest demand.

The college judging team stood second at the National Dairy Show at Detroit in 27 teams only a few points behind the winners and at the Royal Agricultural Winter Fair in Toronto were first, scoring 330 points more than their closest competitor, standing at the top of horses, beef cattle, dairy cattle and swine with high man in dairy cattle and in swine. Results are not yet in from Chicago.

APICULTURE

The work during the past year has included the regular teaching of apiculture to both the regular and short course students.

Queen-rearing was continued in the College Apiary, although the unseasonable weather curtailed the number of queens produced very materially.

The loss during the winter, and spring of 1926 was the heaviest in Ontario for several years and the total honey crop was considerably below the average. The shortage was due not alone to the smaller number of colonies, but to the very unseasonable weather experienced during both the light and dark honey flows.

There were 199 apiary inspectors appointed and the apiary inspection figures show that the beekeepers throughout the Province are beginning to appreciate that the presence of American foulbreed is a serious matter and that destruction of the contents of infected colonies and treatment of other infected material, are the only sure means of finally controlling this destructive disease.

During the year the clean-up campaign has been introduced into the Counties of Middlesex, Wentworth, Victoria, Lennox & Addington and Renfrew and good work was done in these counties.

The Counties of Simcoe, Oxford, Haldimand, Bruce and Ontario have petitioned for a clean-up campaign to commence in 1927 if possible. The beekeepers of York County passed a resolution in favour of a clean-up campaign, provided recompense be given for destroyed infected colonies.

The inspectors for the city of Toronto have been working on the clean-up plan for the past two years and report conditions much improved over those previously existing.

Apiary inspection in Ontario still presents many difficulties, the most noticeable being the impossibility of securing enough inspectors of experience to carry on the work in the most efficient manner.

After fifteen years' work with apiary inspection in Ontario and two States across the line, experience shows that the only certain method of eliminating American foulbrood to the point where it will do little damage, is destruction by the inspector of the contents of all infected colonies. Educational methods alone, with the choice of treatment left to the beekeeper, simply means a spread of the disease, because so many beekeepers will attempt to save some of the infected material and carry over the infected colonies until some time later in the season. Inspection of apiaries in Ontario has been in operation for the past twenty years and for the greater part of this time beekeepers were allowed to treat infected colonies, with the result that American foulbrood has spread to many places where it did not previously exist and has caused many thousands of dollars' loss to the beekeeping industry.

DAIRY HUSBANDRY

The following is a brief summary of the experiments conducted in the Dairy Department during the season between College terms of 1926:

1. "Flash" and "Holding" methods of pasteurising milk at 140°F., 150°F., and 160°F., were compared for the making of Cheddar Cheese. The yield of cheese was greater by the "holding" plan at 140° and 150°, but slightly less at 160°, as compared with yields from lots "flashed" or heated quickly at the same temperatures. The quality of the cheese was better in all cases where the milk was held for twenty minutes at the heating temperatures. With the milk which we receive, it is not advisable to heat it above 145°F., either by "flash" or "holding" methods. Above this temperature the curds do not mat properly as required in the Canadian Cheddar system of making cheese.

2. Cultures (starters) were added to cheese milk, made from more or less pure ordinary lactic acid sources, and these compared with cultures made from an acidophilus organism supplied by the Bacteriological laboratory. Ordinary lactic, and mixed lactic and acidophilus culture were also compared. There was little or no difference in the yield or in their effects on the quality of cheese when the pure cultures of each were used. The mixed lactic and acidophilus culture produced cheese a little poorer in quality as compared with the cheese made by using ordinary lactic culture. The acidophilus organisms did not appear in a curd sample taken before salting, and apparently did not survive the process of cheese manufacture in this particular case.

3. Three commercial brands of cheese colouring were tested and all produced a shade of colour in the cheese that would be acceptable to the trade. One brand of colouring produced a uniformly lighter shade (using it at the same rate, one ounce per 1,000 pounds milk) than did the other two, and apparently was weaker.

4. The addition of sodium citrate or sodium phosphate to "blended" or "process" cheese, improved the quality of the product. This year the citrate gave better results than the phosphate. Last year the sodium phosphate cheese were considered the better.

5. One pound Cheddar Cheese were coated with paraffine wax, which was heated to 160°, 180° and 200°F. The high temperature gave the best results. Coating the cheese twice or more, prevented bulging of the cheese, where they were held at a temperature of about 70°F. for curing. Colouring the wax with butter colour before coating the cheese also improved the appearance of the cheese.

6. Comparative tests of two lime neutralizers, a soda ash, and a carbonate of soda neutralizer indicate that all four gave good results in reducing the acidity of cream before pasteurization. There was not much difference in the quality of butter made by using the four neutralizers in the cream, after holding in cold-storage for one to three months. The sodium carbonate neutralizer appears to have many good qualities to recommend it.

7. Boxes of butter finished with a smooth surface kept the flavour at the surface better than did boxes of similar butter finished with a roller which leaves a corrugated finish more pleasing to the eye, but on account of greater surface exposure, spoils more on the top of the box.

8. Customers of the Market Milk branch in the Dairy Department, preferred whole milk for general home use, to condensed, evaporated, or dried milk. Sweetened condensed milk was acceptable for coffee or cocoa drinks, and evaporated (unsweetened) milk for cooking purposes.

9. Cream which separates after bottling should be standardized with whole or skim milk before pasteurization, then be heated to 150°F., held for half an hour, then cooled below 50°F. Cream, other than "whipping" grade, should be viscolized or homogenized before bottling where possible, as this will prevent separation in the bottle.

10. Whipping cream containing 30 per cent. fat made a firmer whipped product than did cream testing 24 per cent. fat. Cream whipped at 40°F. produced a larger yield, less separation and a firmer cream than did similar cream whipped at 50°. The addition of rennet or gelatin to cream before whipping decreased the volume of product, but there was less separation after standing, as compared with similar lots of cream whipped without the addition of rennet or gelatin.

11. Rennet added to the ice-cream mix containing less than 36 per cent. of solids produced a firmer body and smoother texture in the ice-cream than did mixes not having rennet. Where the solids of the mix were above 36 per cent., there was no improvement in the quality of the hardened ice-cream by the addition of rennet to the mix. Rennet increases the whipping qualities and the ice-cream melts less rapidly as compared with mixes containing no rennet.

12. Temperatures of ice-cream mix viscolization at 110°, 145° and 160°F. had no effect on the body and texture of the ice-cream, in the tests with cream, but where saltless butter was used as the source of fat for the mix, a temperature of 145°F. gave best results for viscolizing. The temperature of viscolization, apparently, did not cause any difference in the melting resistance of the hardened ice-cream.

FIELD HUSBANDRY

The Field Husbandry Department is fortunate in having teaching, extension work, field experiments, plant breeding and certain lines of investigation all included in the one Department. During the past year the work in these various lines has been largely satisfactory. Although the season has been exceptionally wet practically no experimental crops were lost and many good results were obtained.

The best varieties of nearly all the leading farm crops of Ontario have been originated at the Ontario Agricultural College by means of hybridization and selection. In a new country there is a tendency towards decreasing yields as time advances unless fertility is added to the farms from outside sources. In Ontario, however, it is interesting to know that there has been a gradual increase

in acre yields in some of the principal farm crops. Based on reports of the Ontario Department of Agriculture the following table showing average yields of grain in bushels per acre per annum for the whole Province is both interesting and suggestive:—

Crops	1882-1901 (20 years)	1902-1921 (20 years)	1922-1925 (4 years)
Oats	34.1	36.5	38.6
Barley	25.8	30.2	32.4
Winter Wheat	20.0	23.2	26.3

From this as well as from other information it is very evident that the introduction by the college of such varieties as Siberian, Banner, O.A.C. No. 72, O.A.C. No. 3 and O.A.C. No. 144 oats; Mandscheuri and O.A.C. No. 21 barley; Dawson's Golden Chaff and O.A.C. No. 104 winter wheat has had a very decided influence on the increase in acre yields throughout the Province. It is estimated that these increases in acre yields for the three crops here enumerated would amount, when valued at average market prices, to upwards of $200,000,000 in the last two dozen years.

Some of the other crops on which the college has conducted plant breeding work have also increased while a few including some minor crops such as field carrots in which no plant breeding work has taken place have actually shown a decrease in acre yields throughout Ontario. From experiments conducted at the college previous to the introduction of the new varieties of high merit it was fully expected that these would have a decided influence in the improvement of both the quality and the quantity of Ontario's field crops. The returns should be even greater as the newer and better varieties become more generally grown on all the farms.

HORTICULTURE

Teaching work has, as usual, taken a very considerable amount of time of the department staff, especially since the division into different options.

On the campus we have been busy replacing the evergreens which have died with others of as large size as it is possible to move. We have also been removing unsightly fences around some of the houses and replacing them with cedar hedges. We have added to the test gardens about two hundred and fifty new varieties of roses, one hundred and seventy-five of gladioli, ninety-four of paeonies and seventeen of dahlias. We have been labelling trees and shrubs on the campus with both the common and scientific name. This work has been done in conjunction with the Department of Botany in order that the labelling be correct. In the test gardens all of the varieties have been carefully labelled. This means that visitors to the grounds and test gardens are able to obtain the name of a particular variety without disturbing our regular work.

From the old orchard of ten acres we have removed a good many of the worthless varieties and have replaced them with all of the newer varieties so that in a few years we hope it will be of great value. We also finished planting a commercial orchard of ten acres on the Hamilton farm which will be used for the carrying on of purely commercial practice in orcharding. A number more of the young seedling apple trees have fruited. Some of them appear of extreme value, three of Wealthy-Wagener cross having apparent worth-while commercial qualities, most of them being of Jonathan shape which will make them valuable for box packing.

In experimental work in apples, we have been carrying on experiments in conjunction with the Physics and Chemistry Departments on colour in apples to see if there is any means by which we can increase the red colouration. The work is yet in its infancy and will be carried on for a considerable time.

A plot of thirty-seven varieties of strawberries has been planted on the farm of Mr. Harry Pettit of Burlington, Ontario, Mr. Pettit taking charge of the plot free of charge. As these are all of the best commercial varieties it will be of extreme interest to all the strawberry growers in that district and Ontario. We added to our grape plantation and now have representatives of all of the better varieties. We have also added the newest varieties to our raspberry plantation.

A very considerable amount of time was spent during the spring and summer on the spray service in Halton and Peel counties in conjunction with the Agricultural Representatives in these counties. Some forty-two growers were given service and expressed appreciation for it.

We are carrying on with Mr. Paul Fisher of Burlington and in co-operation with the Department of Chemistry a test to find out the value of various forms of nitrogen on an apple orchard. This will of necessity have to be carried on over a period of five years.

In vegetable work we have been carrying on steady extension service among the growers, both on their own places and in their branches. A bulletin has been published at different times in the year containing information on markets, crop conditions and control of insects and diseases. This information is made as timely as possible. We have carried on in conjunction with the Department of Chemistry a certain amount of work on straw as a means of heating hot beds. This work is as yet in the initial stages and will be reported on later.

Exhibits have been put in at both the Royal Winter Fair and Canadian National Exhibition largely along the lines of home ground beautification. The interest in this work has increased due to these exhibits.

In conjunction with the Demonstration Farm at New Liskeard, we produced a quantity of Norfolk Savoy spinach seed, at that place, in 1925. This seed was distributed among a number of growers in the Province and also samples were sent to some of the leading seedsmen in the United States. In all cases it was found that this seed was from ten days to two weeks earlier when tested alongside of seed of ordinary commercial sources. We hope that we may be able to develop a certain amount of trade in the seed of varieties of vegetables which will grow seed in the cooler conditions of the north.

POULTRY

The year was unusual in that hatches in general were poor, and the crop of chickens rather late. The prices for both poultry and eggs have been well maintained. The dull weather and the general lack of sunshine, throughout the winter and spring may have had much to do with the early unsatisfactory hatching season.

The hatching and rearing at the poultry department has never been better than it was this year. There may have been several causes, but the following are worthy of attention:—

Milk as a protein source, as compared to beef scrap or tankage, has for a number of years given better hatching eggs.

The addition of two per cent. of cod liver oil to the mash has given better hatches and stronger chicks.

Old hens, or hens from laying competitions, that have made good records, are at times doubtful breeders, but if given from six to eight weeks' rest and abundance of green feed and free range, usually make the very best of breeders.

A new undertaking for the year, was the starting of a Turkey Farm in Norfolk County. The land is of a sandy nature, rather low in fertility and there has been a fairly large number of grasshoppers in this area.

Nearly two hundred turkeys were hatched in incubators at the college. These were moved to the Turkey Farm about June 20th, and were reared around coal burning brooders. The turkeys grew very well, and but one was lost by disease. Crows, hawks and other pests took a few. The total loss from all causes was not greater than 10%.

The turkeys were started on sour milk curds, dried off with middlings. Two per cent. of cod liver oil was given in the mixture. There was abundance of tender green feed, and gravel was always available as a source of grit.

The work in connection with the World's Poultry Congress is taking considerable time, and is progressing favourably.

The extension work grows each year, and it is becoming a serious problem to meet the demands.

An attempt was made, this year, to train a number of persons in each country to do the local culling of poultry. It was believed that, if a local culling school could be conducted each year, in general more people could have their hens culled.

EXTENSION

Assistance has been given in so far as it has been possible to the various extension activities conducted within the Province by the college and the other branches of the Department of Agriculture.

Exhibitions.—Educational exhibits were prepared in co-operation with the other departments of the college and staged at the most important exhibitions and fairs within the Province during the year. Service was given, questions discussed with farmers and others, advice offered on all phases of agriculture and bulletins were distributed to all seeking information.

Bulletins and Circulars.—Revisions for new editions of college bulletins were secured. A weekly press bulletin was sent out to the agricultural representatives, the agricultural press, the weekly press, the city dailies publishing agricultural news and various departmental officials. A column a week has been supplied by this department for distribution to the rural weeklies.

Advertising.—All advertising connected with long and short courses was carried out by this department.

Farmers' Week.—The detail of management of this very successful week was undertaken by the Extension Department. Some 7,000 farm people visited the college during the four day period, of these 4,200 were given lunch in the Gymnasium.

Rural Girls Conference.—Assistance in organization was given to the officials of Macdonald Institute and the Woman's Institute Branch of the Department of Agriculture.

Packet Library.—This important work has increased during the year. The service now extends to Woman's Institute members, Young People's Societies, Junior Farmers' and Junior Woman's Institutes and many unattached individ-

uals over the Province. Over 2,000 applications for assistance with problems of various kinds were received and attended to. The variety of topics on which information is sought continues to widen. The files were replenished with copies of plays, booklets and clippings from various sources during the year. On one day in January thirty-two requests for help with debates and plays reached the Packet Library. Many requests for specific information on subjects not handled by other branches of the Department of Agriculture were referred to this office for attention.

Experiment Stations.—General supervision was given to the Experiment Station at Ridgetown and to the Demonstration Farm at New Liskeard.

Lectures.—Two courses in Veterinary Physiology were given to classes of the Ontario Veterinary College throughout the college year.

FARM MECHANICS

The instructional work of this Department has been much the same as in the last five years except that, as time has allowed, more stress has been placed upon the subjects of Farm Machinery and Farm Buildings. The former subject has been greatly aided through the generosity of the various implement manufacturers who have been ever ready to keep us supplied with their latest types. This year, the Massey-Harris Company have put in a new mower, one of their small sprayers and a new manure spreader. This spreader has some interesting structural changes. The International Harvester Company are making an almost complete change in the lines at present here. These will be available for the coming term.

Instruction in gas engines and tractors has been facilitated by the following implements:

10-20 McCormick-Deering Tractor
Model "W" Cletrac Tractor
Fordson Tractor
1926 type of Ford Chassis.

All of which have been loaned by their respective companies.

It should be noted that for some time we have been greatly hampered by lack of space. Demonstration in machinery operation require considerable floor room. An additional building towards the north-east would provide this needed room, and at the same time the slope of the land in that direction would allow for a basement large enough to accommodate the fleet of cars, trucks and tractors belonging to the College.

The name, Department of Farm Mechanics, should be substituted for that of Department of Manual Training, in view of the fact that Manual Training was discontinued as a subject about five years ago.

Competitions at the Fall Fairs have caused an increased interest in birds and many inquiries for information regarding bird houses have been received. At present we are working on a short bulletin on this subject.

During the illness of Prof. Evans we have had the assistance of Mr. E. G. Webb, B.S.A., who is giving every satisfaction.

THE LIBRARY

During the year 700 volumes were added to the Library. These are classified as follows:

Agriculture	64	Education	7	Meteorology	3
Agricultural Reports	60	Engineering	4	Manual Training	5
Bacteriology	9	Entomology	10	Philosophy	4
Bees	2	Ethics and religion	7	Physics	6
Biography	14	Fiction	58	Political science	9
Biology	13	Fine Arts	17	Poultry	6
Botany	19	Forestry	2	Reference books	18
Chemical technology	14	Genetics	5	General magazines	32
Chemistry	44	Geology	4	Science	32
Dairy	6	History	5	Science reports	10
Description and travel	4	Horticulture	17	Sociology	10
Domestic animals	18	Horticultural Reports	7	Veterinary science	2
Domestic science	41	Hygiene	5	Zoology	11
Economics	35	Literature	61		

Volumes of periodicals, bulletins and circulars to the number of 239 were bound.

Among the reference books added to the Library were:

Funk & Wagnalls—New Standard Dictionary of the English Language.
Palgrave's Dictionary of Political Economy—3 vol.
The Book of Popular Science—15 vol.

The circulation (books taken out of the Library) for the year was 9,936, the various classes being represented as follows:

General periodicals	444	Agriculture	1,936
Philosophy	59	Fine Arts	170
Religion	60	Literature	1,041
Sociology	1,032	History	231
Science	1,639	Fiction (includes supplementary reading)	2,844
Useful Arts	386	Biography	94

We wish to take this opportunity of expressing our appreciation of our exchanges, especially those of the U.S. Department of Agriculture, and the Experiment Stations of England, Europe, India, Australia, New Zealand, South Africa, Japan, the United States and South America.

MACDONALD INSTITUTE

Summary of Attendance in 1926

A.—January to June, completing the College Year 1925-1926.	
1. Normal Course in Home Economics—two-year course:—	
(*a*) Juniors	14
(*b*) Seniors	12
2. Associate—two-year course:—	
(*a*) Juniors	36
(*b*) Seniors	34
3. Institutional Management—two-year course:—	
(*a*) Juniors	12
(*b*) Seniors	14
4. Homemaker—one-year course	30
5. Short Course in Home Economics:—	
(*a*) Winter	17
6. Optional Course:—	
(*a*) Winter	5
(*b*) Spring	3
7. Student-worker	1
8. Public School Classes	47
9. Course in Dietetics and Therapeutics for Nurses	0
B.—September to December, opening the College Year 1926-1927.	
1. Normal Course in Home Economics—two-year course:—	
(*a*) Juniors	13
(*b*) Seniors	13
2. Associate—two-year course:—	
(*a*) Juniors	38
(*b*) Seniors	34
3. Institutional Management—two-year course:—	
(*a*) Juniors	15
(*b*) Seniors	13
4. Homemaker—one-year course	33
5. Short Course in Home Economics (Fall)	11
6. Optional Course	1
7. Student-worker	0
8. Public School Classes	58
9. Course in Dietetics and Therapeutics for Nurses	14
C.—Students entered in both above lists	60
D.—Total number of students in 1925	416
Total number of students in 1926	408
E.—Girls' Conference (attendance) May 5, 6, 7, 1926	214

The Normal Course in Home Economics

Thirteen entered this course in September, 1924; one dropped out in December, 1924; twelve passed to the senior class in June, 1925; twelve passed the final examinations in June, 1926, and have received the Macdonald Institute Teacher's Certificate in home economics.

Fourteen entered the course in September, 1925; one withdrew in March, 1926; thirteen passed to the senior class in June, 1926; one withdrew in June, 1926; one transferred from the associate course in September, 1926, and thirteen are now in attendance.

Thirteen entered the Junior class in September, 1926, and are now in attendance.

The Associate Course

Thirty-four entered in September, 1924; one entered in January, 1925, having credit from Toronto University to cover the first term's work; thirty-four passed to the senior class in June, 1925; a student who had taken her first year in 1921-1922 re-entered in September, 1925; one dropped out in December, 1925; thirty-three passed the final examinations in June, 1926, and have received the Macdonald Institute Associate Diploma.

Thirty-three entered the course in September, 1925; two transferred from the homemaker course in January, 1925; one who received credit on previous household science work taken at Truro Normal School entered the course in January, 1926; one dropped out at the beginning of the second term and one dropped out in March, 1926; thirty-four passed to the senior class in June, 1926; one transferred to the senior normal class in September, 1926; one who graduated in the homemaker course in June, 1924, and who took optional work from January to June, 1926, thus covering the first year associate work not taken in the homemaker course, was admitted to the senior class in September, 1926, making a total of thirty-four in attendance.

Thirty-eight entered the junior class in September, 1926; two dropped out in October, 1926, and thirty-six are now in attendance.

The Institutional Management Course

Thirteen entered the course in September, 1924; one who had taken her first term from September to December, 1922, re-entered in January, 1925; one who had taken the first two terms from September, 1923, to March, 1924, re-entered in April, 1925; one dropped out in April, 1925; fourteen passed to the senior class in June, 1925; one who had taken her first year in 1908-1909 and who had taken optional work during the college year 1924-1925, entered the senior class in September, 1925; one withdrew in February, 1926; thirteen passed the final examinations in June, 1926, and have received the Macdonald Institute Institutional Management Certificate.

Twelve entered the course in September, 1925; one withdrew in December, 1925; one who had taken her first two terms from September, 1924, to March, 1925, re-entered in April, 1926, and dropped out a few days later; eleven passed to the senior class in June, 1926; one who had graduated in the homemaker course in June, 1925, and who took optional work from January to June, 1926, thus covering the first year institutional management work not taken in the homemaker course, was admitted to the senior class in September, 1926; one who had taken her first year in 1924-1925 and who took the first term and part of the second term in 1925-1926 entered in September, 1926, to repeat her first term and part of the second term of her second year, but dropped out a few days after opening, making a total of twelve in attendance.

Fourteen entered the course in September, 1926; one dropped out in October, 1926, one transferred from the homemaker course in October, 1926, and fourteen are now in attendance.

The Homemaker Course

Thirty-six entered the course in September, 1925; two transferred to the associate course in December, 1925; five withdrew from the class at the end of the first term; a short course student who was successful at the Christmas examinations was given to the homemaker course, was admitted to the homemaker course in January, 1926; four withdrew during the second term; three withdrew during the third term; twenty-three passed the final examinations in June, 1926, and have received the Macdonald Institute Homemaker Diploma.

Thirty-four were admitted to the course in September, 1926; one transferred to the institutional management course in October, 1926; one transferred from the short course in October, 1926; thirty-four are now in attendance.

THE SHORT COURSE

Seventeen entered the January, 1926, to March, 1926, course.

Eleven entered the September, 1926, to December, 1926, course; one transferred to the homemaker course; ten are now in attendance.

THE OPTIONAL COURSE

Nine students joined various clothing, food and lecture courses during the year. One student who graduated from the homemaker course in June, 1926, entered for two weeks in November, 1926, to observe the demonstration work.

A graduate of Hauslaltungsteminar, Berne, Switzerland, entered in November, 1926, for one month's observation work.

STUDENT WORKER

One student took this work from January, 1926, to June, 1926.

GIRLS' CONFERENCE

In order to bring the girls of the province together for a conference on the problems and interests of the country girl, the Ontario Agricultural College was asked to allow such a conference to be held at the college in May. The students of Macdonald Institute, under the direction of Miss Mayme C. Kay, arranged the programme and the Institutes' Branch advertised the conference. The attendance for the three days, May 5, 6 and 7, was two hundred and fourteen girls, practically all from farm homes.

DIETETICS AND THERAPEUTICS FOR NURSES

Fourteen nurses of St. Joseph's Hospital, Guelph, registered for this course in September, 1926, one dropped out, thirteen are now in attendance.

REPORT ON LOAN COLLECTION

Requests

Home Interests	11	Social	16
Nutrition and Food	115	Textiles and Clothing	10
Health	7	Special Letters	42
Household Economics	21	*Referred to Massey and other departments*	176
Education	26		
			424

Answered by: 1,156 folders, articles and clippings, 81 books, 13 magazines.

Financial Statement, 1926

COLLEGE DEPARTMENT

EXPENDITURE

Salaries and wages	$198,816 07
Servants pay-list	13,745 23
Mechanical; supplies and expenses	247 36
Library; supplies and expenses	2,999 01
Meat, bread, groceries, laundry, engine-room supplies and fuel	79,227 18
Advertising, printing, postage and stationery	2,999 85
Expenses short courses	1,387 47
Temporary Assistance	3,694 45
Purchase and maintenance of automobiles, trucks and tractors	2,894 63
Student-labour	2,498 74
Travelling expenses and exrra lectures	3,481 96
Expenses College judging team, Chicago Live Stock Exhibition	400 00
Scholarships	110 00
Telephone service, rent, etc	1,176 27
Furnishings and repairs	9,160 87
Feed for horses	73 62
Contingencies	1,648 03
Rebate fees to students at the Ontario Agricultural College, who have served overseas and who are not receiving vocational training assistance	330 00
Maintenance of gymnasium	898 02
Research scholarships, Vote 135, item 13	490 98
Total Expenditure	$326,288 74
Less revenue	109,988 26
Net expenditure	$216,300 48

REVENUE STATEMENT, 1926

College

Board	$80,943 50
Tuition and laboratory fees	17,724 50
Supplemental examinations	272 00
Rent of rooms	1,520 50
Rent of houses	7,699 00
Rent of post-office boxes	40 50
Fines, breakages, etc	1,551 00
Library	29 52
Sundries	207 74
Total revenue	$109,988 26

STUDENT LABOUR ANALYSIS, 1925-1926

November 1st, 1925, to October 31st, 1926, inclusive, 12 months

Total per month		*To different departments*	
November, 1925	$221 81	Mechanical Dept	$7 65
December, 1925	368 19	Library Dept	3 55
January and February, 1926	149 50	College	599 50
March and April, 1926	97 03	Gymnasium	9 25
May, 1926	299 16	Bacteriology Dept	159 85
June and July, 1926	208 64	Botany Dept	90
August, 1926	323 26	Chemistry Dept	18 12
September, 1926	511 60	Extension Dept	33 24
October, 1926	319 55	Farm Dept	262 79
		Field Husbandry Dept	728 85
		Poultry Dept	225 25
		Horticulture Dept	434 13
		Apiculture Dept	15 66
Total	$2,498 74	Total	$2,498 74

FORESTRY

Expenditure

Contingencies	$988 35

BACTERIOLOGY DEPARTMENT

Expenditure

Stenographer	$850 00
Janitor	950 00
Supplies and expenses	2,899 02
Total expenditure	$4,699 02
Total revenue	6,485 63
Less expenditure	4,699 02
Net revenue	1,786 61

Revenue Statement, 1926

Bacteriology Department

Sale of cultures, as per statements rendered monthly	$6,485 63

BOTANY DEPARTMENT

Expenditure

Stenographer	$762 49
Janitor	945 76
Travelling and other expenses in connection with plant diseases	992 40
Supplies and expenses	1,974 05
Total expenditure	$4,674 71
Less revenue	15 53
Net expenditure	$4,659 18

Revenue Statement, 1926

Botany Department

Revenue, as per statements sent in monthly	$15 53

CHEMISTRY DEPARTMENT

Expenditure

Soil survey and demonstration work	$6,956 24
Analyst	2,000 00
Laboratory assistant	1,400 00
Second laboratory assistant	1,100 00
Stenographer	600 00
Stenographer	770 00
Janitor	500 00
Supplies and expenses	4,871 06
Total expenditure	$18,107 30
Less revenue	859 56
Net expenditure	$17,247 74

Revenue Statement, 1926

Chemical Department

Chemical analyses, as per statements rendered monthly	$859 56

ENTOMOLOGY DEPARTMENT

EXPENDITURE

Supplies and expenses	$2,498 71
Stenographer	725 00
Corn-borer investigation	2,580 25
Total expenditure	$5,803 96

ENGLISH DEPARTMENT

EXPENDITURE

Supplies and expenses	$499 65
Secretary for loan library and stenographer	840 00
Total expenditure	$1,339 65

MANUAL TRAINING DEPARTMENT

EXPENDITURE

Janitor	$1,000 00
Supplies and expenses	2,597 08
Total expenditure	$3,597 08

PHYSICS DEPARTMENT

EXPENDITURE

Stenographer	$720 00
Salaries and expenses in drainage work	11,494 80
Supplies and expenses	1,799 41
Total expenditure	$14,014 21
Less ervenue	14 60
Not expenditure	$13,999 61

REVENUE STATEMENT, 1926

Physics Department

Revenue from drainage, as per statements sent in monthly	$14 60

FARM ECONOMICS DEPARTMENT

EXPENDITURE

Farm surveys, services, travelling and other expenses, and equipment, purchase and maintenance of automobiles, contingencies, fuel, light, and supplies. (Items 1 & 2)	$19,340 54

EXTENSION DEPARTMENT

EXPENDITURE

Director	$3,500 00
Secretary in charge package library	925 00
Advertising, travelling expenses, package library, exhibits, postage, stationery, supplies, contingencies	4,424 18
Total expenditure	$8,849 18

MACDONALD INSTITUTE AND HALL

EXPENDITURE

Salaries and wages	$24,978 65
Servants pay-list	1,148 40
Meat, bread, groceries, laundry, engine-room supplies, fuel, furnishings, repairs, and labour on grounds	23,530 90
Maintenance of laboratories in institute	2,083 73
Library and stationery	749 48
Contingencies	446 50
Total expenditure	$52,937 66

ANIMAL HUSBANDRY DEPARTMENT

Expenditure

Permanent improvements	$994 17
Wages of men, and foreman	17,070 45
Purchase and maintenance of live stock	14,395 37
Farm maintenance (including repairs, blacksmithing, binder-twine, furnishings, fuel, light, advertising, printing, stationery, tools, implements, etc.)	4,416 77
Stenographer	750 00
Contingencies	186 60
Total expenditure	$37,813 36
Less revenue	28,330 31
Net expenditure	$9,483 05

Revenue Statement, 1926

Animal Husbandry

Sale of Cattle:—		
28 Bulls at from $45.00 to $170.00	$3,480 00	
44 Cows at from $42.00 to $285.00	5,313 40	
5 Steers for	861 10	
8 Steers, 7,450 lbs. at from 5¼ to 20c	797 70	
3 Calves, at from $14.00 to $15.00	43 00	
		$10,495 20
Sale of Pigs:—		
50 Boars, at from $11.00 to $70.00	1,215 50	
148 Sows, at from $15.00 to $82.50	6,508 50	
108 Hogs, 23,699 lbs., at from 6 to 14½c	3,072 39	
		10,796 39
Sale of Sheep:—		
16 Rams, at from $15.00 to $32.50	362 50	
40 Ewes, at from $5.00 to $30.00	612 50	
20 Lambs for	150 40	
		1,125 40
Sale of Milk:—		
825 quarts, at 8c	66 00	
154,164 lbs. at $1.85 to $2.80 cwt	4,162 23	
		4,228 23
Sale of Butter-fat:—1,556.11 lbs., at from 32c to 42c		557 78
Service of Animals		451 00
Feed of Horses; hay for 14 horses for one year at $30.00 each		420 00
Sale of 180 bus. mangels at 12c bus		21 60
Sale of 4,850 lbs. of ensilage at $6.00 per ton		14 55
Sale of Wool; 396 lbs. at 31.93c		126 46
Sale of 1 aged horse for		25 00
Sundries		68 70
Total revenue		$28,330 31

FIELD EXPERIMENTS DEPARTMENT

Expenditure

Permanent improvements	$1,745 80
Foreman, Teamsters, and labourers	14,494 78
Seeds, manure, and special fertilizers	749 21
Furnishings, implements, repairs, blacksmithing, etc	998 93
Printing, postage, stationery, contingencies, etc	673 91
Purchase and feed of horses	485 59
Stenographers (3)	2,200 00
Machinery for grain cleaning, Vote 135, item 11	999 62
Total expenditure	$22,347 84

EXPERIMENTAL DAIRY DEPARTMENT

Expenditure

Permanent improvements		$460 53
Wages, including cheesemakers, butter-makers, and book-keeper, assistant and official tester of dairy cattle		1,918 49
Purchasing, hauling and manufacturing milk		6,559 70
Furniture, furnishings, repairs, etc., laboratory expenses, gas, chemicals, etc., and contingencies		1,428 50
Fuel and light		3,388 85
Total expenditure		$13,756 07
Less revenue		8,953 77
Net expenditure		$4,802 30

Revenue Statement, 1926

Experimental Dairy Department

Sale of Cheese; 8,024¼ lbs., at from 10 to 60c		$2,004 53
Sale of Butter; 6,572¼ lbs., at from 30 to 48c		2,919 07
Sale of Cream:—		
705 quarts, at from 50 to 70c	$361 18	
586.98 lbs. butter-fat at from 50 to 55c	295 24	
		656 42
Sale of Ice-cream:—		
3,043¼ pints, at from 22 to 30c	698 91	
11 gallons at $1.35	14 85	
		713 76
Sale of Milk:—		
5,390½ quarts, at from 8 to 10c	451 05	
56,467 lbs., at from $1.75 to $3.00 cwt	1,237 98	
366 lbs. milk-powder, at 12½c	45 75	
		1,734 78
Sale of skim and buttermilk; 346,507 lbs., at 25c cwt		866 28
Sale of wheymilk; 102,090 lbs., at 5c swt		51 05
Sundries		7 88
Total revenue		$8,953 77

DAIRY SCHOOL

Expenditure

Permanent improvements, cement floors, walks, etc		$77 55
Wages of instructors, engineer, janitor, stenographer, and book-keeping		1,492 71
Cleaning, painting, repairs, and contingencies		289 16
Dairy appliances, separators, vats, expenses, cheese and butter judges, inspecting factories, etc		664 15
Advertising, printing, stationery, postage, books, papers, etc		147 41
Fuel and light		594 60
Purchase of milk, and cost of hauling milk and cream		5,495 92
Total expenditure		$8,761 50
Less revenue		4,347 64
Net expenditure		$4,413 86

Revenue Statement, 1926

Dairy School

Sale of Cheese; 1,628½ lbs., at from 25 to 60c		$447 97
Sale of Butter; 3,444 lbs., at from 30 to 48c		1,545 74
Sale of Cream; 375½ quarts at from 50 to 70c		194 56
Sale of Ice-cream:—		
2,302 pints, at from 15 to 30c	535 86	
1 gallon, at $1.35	1 35	
		537 21
Sale of Milk:—		
3,287½ quarts, at from 8 to 10c	281 75	
29,531 lbs., at from $2.20 to $3.20 cwt	787 23	
		1,068 98
Sale of skim and buttermilk; 91,980 lbs., at 25c cwt		229 95
Sale of wheymilk; 30,750 lbs., at 5c cwt		15 38
Fees		296 00
Sundries		11 85
Total revenue		$4 347 64

POULTRY DEPARTMENT

Expenditure

Wages	$6,403 82
Furnishings and repairs	2,996 05
Permanent improvements	283 76
Purchase of stock	373 75
Fuel, light and contingencies	2,397 18
Experiments with incubator, fattening and feed	15,979 99
Feed of horses	60 00
Poultry extension work, including purchase and maintenance of automobiles	7,929 88
Stenographer	632 00
Total expenditure	$37,056 43
Less revenue	19,236 25
Net expenditure	$17,820 18

Revenue Statement, 1926
Poultry Department

Sale of Live Poultry:—		
2,788 live birds for	$5,134 50	
3,469 day old chicks for	459 99	
		$5,594 49
Sale of Dressed Poultry; 16,631 lbs., at from 14 to 70c		4,617 02
Sale of Eggs for Hatching:—		
402 setts at from $1.00 to $15.00	721 40	
26,778 eggs, at from 6 to 18c each	*3,058 49*	
		3,779 89
Sale of eggs for Domestic Use; 13,544½ dozen, at from 20 to 80c		5,244 85
Total revenue		$19,236 25

HORTICULTURAL DEPARTMENT

Expenditure

Permanent improvements	$1,195 40
Foreman, teamsters, labourers, orchardist, florist, and other employees	17,949 48
Trees, plants, seeds, bulbs, fertilizers, implements, tools, furnishings, repairs and contingencies	4,464 00
Fuel and light	2,243 22
Feed and horses	*599 39*
Stenographers (2)	950 00
Extension work in vegetable growing	3,976 86
Total expenditure	$31,378 35
Less revenue	4,058 29
Net expenditure	$27,320 06

Revenue Statement, 1926
Horticultural Department

Sale of fruits, vegetables, plants, flowers, etc., as per statements rendered monthly	$4,058 29

APICULTURE DEPARTMENT

Expenditures

To provide for equipment, maintenance, and wages	$1,538 90
Stenographers (2)	1,500 00
Queen rearing apiary maintenance	588 68
To provide for inspection of apiaries, and travelling and other expenses in connection *with apicultural work*	14,994 45
Total expenditure	$18,622 03
Less revenue	5,731 75
Net expenditure	$12,890 28

Revenue Statement, 1926
Apiculture Department

Sale of honey, bees, etc., and inspection fees, as per itemized statements rendered monthly	$5,731 75

ONTARIO AGRICULTURE COLLEGE

Financial Statement, 1926

Summary

	Expenditure	Revenue	Net Expenditure
College	$326,288 74	$109,988 26	$216,300 48
Forestry	988 35	....	988 35
Bacteriology	4,699 02	6,485 63	....
Botany	4,674 71	15 53	4,659 18
Chemistry	18,107 30	859 56	17,247 74
Entomology	5,803 96	....	5,803 96
English	1,339 65	....	1,339 65
Manual Training	3,597 08	....	3,597 08
Physics	14,014 21	14 60	13,999 61
Farm Economics	19,340 54	....	19,340 54
Extension	8,849 18	....	8,849 18
Macdonald Institute and Hall	52,937 66	....	52,937 66
Animal Husbandry	37,813 36	28,330 31	9,483 05
Field Experiments	22,347 84	....	22,347 84
Experimental Dairy	13,756 07	8,953 77	4,802 30
Dairy School	8,761 50	4,347 64	4,413 86
Poultry	37,056 43	19,236 25	17,820 18
Horticulture	31,378 35	4,058 29	27,320 06
Apiculture	18,622 03	5,731 75	12,890 28
			$44,4141 00
Less surplus revenue, over expenditure, Bacteriology	....	....	1,786 61
	$630,375 98	$188,021 59	$442,354 39

S. Springer,
Bursar and Superintendent.

Ontario Department of Agriculture

FORTY-EIGHTH ANNUAL REPORT

OF THE

AGRICULTURAL

AND

EXPERIMENTAL UNION

1926

PRINTED BY ORDER OF

HON. J. S. MARTIN, MINISTER OF AGRICULTURE

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

Ontario Agricultural and Experimental Union

OFFICERS FOR 1927

President	C. D. Jarvis, Hamilton.
Vice-President	J. Steckle, R.R. No. 2, Kitchener.
Secretary	C. A. Zavitz, Agricultural College, Guelph.
Assistant Secretary	W. J. Squirrell, Agricultural College, Guelph.
Treasurer	A. W. Mason, Agricultural College, Guelph.
Directors	J. B. Reynolds, F. E. Webster, D. Z. Gibson, W. D. Dyer, H. G. Tillman.
Auditors	R. C. Moffatt and A. M. Porter.

COMMITTEES ON CO-OPERATIVE EXPERIMENTS, 1927

(Arranged in order of continuous service up to the present time.)

Field Husbandry	C. A. Zavitz (Director), W. J. Squirrell, J. Buchanan, A. W. Mason, A. E. Whiteside.
Forestry	E. J. Zavitz (Director), A. H. Tomlinson, H. A. Dorrance.
Agricultural Chemistry	R. Harcourt (Director), S. Waterman, A. H. MacLennan, F. W. Presant.
Apiculture	F. E. Millen (Director), G. L. Jarvis, E. J. Dyce.
Agricultural Botany	J. E. Howitt (Director), T. G. Raynor, Herbert Groh, W. J. Lennox.
Farm Literature	L. Stevenson (Director), O. J. Stevenson, A. MacLaren.
Agricultural Physics	W. C. Blackwood (Director), R. R. Graham, R. C. Moffatt, F. L. Ferguson.
Bacteriology	D. H. Jones (Director), A. Davey, D. B. Shutt.
Animal Husbandry	Wade Toole (Director), J. Steckley, R. G. Knox, G. E. Raithby.
Horticulture	A. H. MacLennan (Director), A. H. Tomlinson, D. A. Kimball, A. G. Richmond.
Farm Economics	A. Leitch (Director), J. Coke, J. B. Hoodless, F. C. Hart. (First appointed January 15th, 1926.)

TREASURER'S REPORT, 1926

Receipts		Expenditures	
Balance from 1925	$810 90	Field Experiments	$2,436 74
Government Grant	2,750 00	Agricultural Chemistry	149 49
Membership Fees, 296 at 50c	148 00	Agricultural Physics	64 00
Interest	35 27	Agricultural Botany	42 25
		Expenses, Annual Meeting, January, 1926	209 50
		Part Expenses Annual Meeting, January 1927	175 14
		Meeting, Board of Control	16 25
		Total	$3,093 37
		Balance on hand	650 80
	$3,744 17		$3,744 17

Ontario Agricultural and Experimental Union

ANNUAL MEETING

The forty-eighth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Tuesday and Wednesday, January 11th and 12th, 1927. All the sessions of the Union, with the exception of the annual dinner, convened in Massey Hall. The annual dinner of the Association was held in the College Dining Hall on Tuesday evening at 6.30 p.m., with W. B. Roadhouse, Deputy Minister of Agriculture for Ontario, in the chair. All the sessions were well attended and were marked with keen interest and lively discussions.

It was moved, seconded and carried that the members of the Experimental Union here assembled express their regret at the unavoidable absence owing to illness of Dr. C. A. Zavitz, Secretary of the Union. The Assistant Secretary was asked to write him, expressing the members' appreciation of his services in the past and a hope that he will be speedily restored to good health.

ASSISTANT SECRETARY'S REPORT

PROFESSOR W. J. SQUIRRELL, O. A. COLLEGE, GUELPH

There are eleven Experimental Union Committees which have undertaken work in connection with co-operative experiments throughout Ontario. The total number of committees is greater to-day than at any other period in the history of the Union. The nature of the work requires that some committees report the results of co-operative experiments each year, while others only at intervals of several years. The Departments covered by these committees are Field Husbandry, Agricultural Botany, Forestry, Agricultural Chemistry, Apiculture, Farm Literature, Agricultural Physics, Bacteriology, Animal Husbandry, Horticulture and Farm Economics.

Each of these committees consists of a director and from two to four additional members. The separate committees are responsible for planning, developing and carrying out the work in their own particular departments. The money grants to the various committees on experiments are expended for work of a purely co-operative experimental character.

This work, which now embraces such a large field in agricultural investigation, is entirely voluntary on the part of all concerned. This, we believe, accounts very largely for the enthusiasm in the work, the economy in the operations and the far-reaching influence of the results. The co-operative experimenters in Ontario not only have made possible for themselves a more prosperous and happier life but have proven themselves benefactors to the whole country.

The committee on Agricultural Chemistry, through well-organized and carefully conducted experiments in the study of soil types, has obtained valuable information on the use of fertilizers and manures on different farm crops. Triangular experiments with fertilizers on potatoes, sugar beets and some of the vegetable crops have now been in progress in different localities for four years

under the direction of the Department of Chemistry. The results of these experiments will be reported upon at this meeting.

The committee on Agricultural Physics has made an extensive study of water supply and conveniences in the farm home. This subject will be reported upon at the present session.

It is safe to say that at no place in America has more definite work been done in testing out, through co-operative means, methods for weed eradication than the system developed by the Experimental Union. The methods found practical in weed eradication by this committee are now used by many good farmers.

For more than a quarter of a century the committee on Forestry has given much encouragement to the reforestation of private holdings and in dealing with the problem of reforesting the large waste land areas situated in the agricultural sections of older Ontario.

The committee on co-operative experiments in Field Husbandry has completed its forty-first year's work and this year had under investigation forty-six distinct projects with farm crops. Altogether there has been a total of 110,910 distinct co-operative tests conducted throughout Ontario, or an average of 2,705 per annum for the forty-one-year period. As was to be expected the work dropped considerably during the war period and immediately after. In no one year, however, excepting the first few years, were there less than 1,600 co-operative experimenters. In 1926 there were a total of 3,277 farmers conducting co-operative experiments in Field Husbandry which was 445 more than in 1925 and 1,083 more than in 1924.

The varieties of farm crops, which are added to the eligible list for registration in Canada, are only those which have had outstanding records at the institution which originated them and whose record has been correspondingly good at at least two other Experiment Stations. In addition to these qualifications the varieties must be distinct in morphological character from existing registrable varieties. In the past two years four varieties, namely, O.A.C. No. 144 Oats, O.A.C. No. 211 Soy Beans, O.A.C. No. 2 Yellow Leviathan Mangels and O.A.C. No. 181 Field Peas, originated at Guelph and which have all given good results in the co-operative experiments over Ontario, were accepted by the Canadian Seed Growers' Association as varieties eligible for registration.

It has been the agricultural history of most new countries that decreasing acre yields in farm crops usually occur after a half century or even less of cultivation. We find, however, that the principal farm crops in the Province of Ontario have given higher yields per acre in the last two decades than they did in the previous two. These increases have been largely due to the introduction of new and better varieties by the College and the Experimental Union.

PRESIDENT'S ADDRESS

F. E. Webster, Creemore, Ontario

I am pleased to welcome you to this the forty-eighth annual meeting of the Ontario Agricultural and Experimental Union. It is gratifying to know that this organization commands the attention of many advanced and thoughtful farmers and also many scientific investigators.

The past season was very wet and brought with it many problems that the farmers had to face. In the year's operations there were many disappointments and a number of bright spots. The winter wheat that survived the winter was

a satisfactory crop and sold at satisfactory prices. Spring wheat gave a poor yield and a very inferior sample. Barley was better than spring wheat, but here, too, the results were poor. The oat crop was the greatest disappointment of all. Not at any time in my life have I seen rust play such havoc with the oat crop as during the past season. The yield was not only poor but as a food it is almost useless. To fill this shortage, farmers in many parts of Ontario have already been compelled to import many cars of oats from the West and corn from the United States. The problem of getting seed for next season's crop is a serious one. It is doubtful if Ontario has enough good seed for the purpose. Just here permit me to say that the scientist who can work out some practical way of combating rust will not only be a great benefactor, he will be worth millions of dollars annually to his country. The vegetable and fruit crops had their ups and downs, but on the whole were an average crop. Hay was less than an average crop. There would have been a shortage had it not been for alfalfa aud sweet clover. They have proven again that they are very valuable forage crops. Alfalfa and sweet clover have already paid off many mortgages on farms, and will pay many more when farmers learn their real value. Better prices for hogs, lambs, poultry, eggs, and some classes of cattle have gone far to make up for the losses suffered from disappointing crop yields. This again proves that diversified farming in Ontario is a safe practice.

While this Experimental Union and the Agricultural College have done much for the general social, cultural and economic advancement of the farmers of Ontario, yet this influence has only reached a small number. The rural people are suffering a great disadvantage by not having just such an education as is given at this College to fit them to meet lawyers, doctors, engineers, ministers, teachers and those in the business world on an equal footing. Many a time I listened to the late Dr. Mills tell farm audiences: "That the boy who remained on the farm without an education would always be a chopper of wood and a hauler of water for his better educated brother in the professions or in business." Dr. Mills was absolutely right. Dr. Merchant declared before the Educational Association that "If our rural people are to compete on equal terms or what is possibly of more importance, with the urban people in our own country, they must have equal facilities for education." Our Professor Leitch told us last year it was the farmer's responsibility to solve his own social, economical and political problems. Are we as Dr. Merchant would say it, "Competent to compete with men in the professions and in business?" I think not. In my thirty-five years of experience as a farmer, if there is one thing that has impressed me more than another it is the lack of men with such cultural, scientific, and business training as could give us leadership in the various activities of farm life. The problem of co-operative marketing is crying for efficient leadership. That leadership must come from the ranks of farmers. If five per cent. of the farm owners were graduates of the O. A. College, you would find that agriculture would make tremendous advances. Ontario would soon be the envy of the world. If we as professors, ex-students and students possess loyalty to farm interests, it is the plain duty of each and every one of us to set up propaganda to so popularize the O A. College among young farmers that we will have a long waiting list for admission before two years have passed. It is our first duty to have this College filled to overflowing before we ask our Government to create new schools of technical agriculture. Many Collegiate Institutes and High Schools draw more regular students from a small district than the O. A. College does from all Ontario. Will some person tell us why? Have we as farmers failed to grasp its importance, or is it because the advantages have not been sufficiently impressed

upon us? Or is it because we as farmers are suffering from a hallucination tha farmers do not require secondary education? I believe the last reason to be th principal one. How shall we meet it? This Experimental Union might wel consider this problem.

We have before us an interesting programme. It deals with many farr problems that are of vital importance to us to-day. I trust you will give thes sessions your thoughtful attention as I know each speaker has a message t give us. Just as you interest yourselves in these different subjects and tak your part in the discussions, just so far will the sessions be a success.

Dr. C. D. JARVIS—What is the solution of the problem? Undoubtedly w need more information concerning the situation. We should ask the Governmen to create a permanent council or commission to make a survey of country-lif conditions and to keep the Government informed concerning the needs of th farming industry. Such a commission should be composed of representatives o business of industry and of labour as well as of agriculture. In short, we need a national policy concerning agriculture based upon facts obtained through investigation by experts and formulated through consultation with associated interest.

CO-OPERATIVE EXPERIMENTS IN FIELD HUSBANDRY IN 1926

RESULTS OF TESTS OF GRAINS, ROOTS, FODDER CROPS, HAY CROPS, POTATOES, ETC.

W. J. SQUIRRELL, ASSOCIATE PROFESSOR OF FIELD HUSBANDRY, O. A. COLLEGE, GUELPH

In 1926 the committee on Co-operative Experiments in Field Husbandry was as follows: C. A. Zavitz (Director), W. J. Squirrell, J. Buchanan, A. W. Mason and A. E. Whiteside. For each of the past forty-one years co-operative experiments in Field Husbandry have been conducted throughout Ontario During this forty-one-year period there has been an average of 2,705 co-operative experiments per annum, the total number in Field Husbandry alone for the whole period amounting to 110,910 distinct and separate tests conducted on Ontario farms.

In the autumn of 1925 material was forwarded for nine, and in the spring of 1926 for thirty-seven distinct co-operative experiments, making a total of forty-six separate co-operative projects under way during the past year. Definite instructions for carrying on the work were furnished with each of these forty-six experiments. The information regarding the two sets of experiments sent out to Ontario farmers and to others interested was as follows:

WINTER CROPS, 1925-26

Material for any one of the nine experiments here mentioned will be sent free to any Ontario farmer applying for it, if he will conduct an experiment with great care and report the results after harvest next year. The seed will be sent out in the order in which applications are received as long as the supply lasts.

1—Testing three leading varieties of winter wheat	3 plots
2—Testing one leading variety of winter rye and one of winter wheat	2 "
3—Testing spring applications of five fertilizers with winter wheat	6 "
4—Testing autumn and spring applications of nitrate of soda and common salt with winter wheat	5 "
5—Testing winter emmer and winter barley	2 "
6—Testing hairy vetches and winter rye as fodder crops	2 "
7—Testing mixtures of hairy vetches and winter rye for seed production	3 "
8—Testing O.A.C. No. 104 winter wheat at three dates of seeding	3 "
9—Testing Dawson's golden chaff (O.A.C. 61) winter wheat at three dates of seeding	3 "

The exact size of each plot is to be one rod wide by two rods long. The material for experiments Nos. 1, 2, 3, 5, 6, 7, 8 and 9 will be forwarded by mail, and for the other one by express. Each person wishing to conduct one of these experiments should apply as soon as possible, mentioning which test he desires, and the material, with instructions for testing and the blank form on which to report, will be furnished free of cost until the supply of experimental material is exhausted.

Spring Crops, 1926

The members of the committee on Field Husbandry of the Ontario Agricultural and Experimental Union are pleased to state that for 1926 they are prepared to distribute in Ontario material for experiments with grains, potatoes, roots, fodder crops and fertilizers. Fully 2,600 varieties of farm crops have been tested in the Experimental Department of the Ontario Agricultural College, Guelph, for at least five years. These consist of nearly all the Canadian sorts, and several hundred new varieties and new strains, a few of which have been originated at Guelph by hybridization and selection and have done exceedingly well in the carefully conducted experiments at the College, and will be used for the co-operative experiments throughout Ontario in 1926.

Each person in Ontario who wishes to join in the work may choose any one of the experiments for 1926, fill out the accompanying form of application and return the same to the Director of the Co-operative Experiments in Field Husbandry at as early a date as possible. The material will be furnished in the order in which the applications are received, until the supply is exhausted. A sheet containing the instructions for conducting the chosen experiment, and blank form on which to report the results of the work, will be sent to each experimenter at the time the fertilizers or seeds are forwarded. All material will be furnished entirely free of charge to each applicant, and the produce of the plots will, of course, become the property of the person who conducts the experiment. In return, the Committee on Experiments desires to ask that each experimenter will sow all the plots belonging to the particular experiment which he has chosen for 1926, and that he will be very careful and accurate in his work and forward to the Director a complete report of the results obtained from the test as soon as possible after the plots are harvested.

All seeds and fertilizers will be sent in good time for spring seeding, providing the applications are received at an early date. The supply of material being limited, those who apply first will be surest of obtaining the desired outfit.

The experiment selected should be indicated by using its number as given in the left-hand column in the list of experiments. Further information is given on the application form which is attached.

Each applicant should make a second choice, for fear the first could not be granted.

Grain Crops	Plots
1—Testing three varieties of oats	3
2—Testing O.A.C. No. 21 barley and emmer	2
3—Testing two varieties of hulless barley	2
4—Testing three varieties of spring wheat	3
5—Testing two varieties of buckwheat	2
6—Testing three varieties of field peas	3
7—Testing two varieties of spring rye	2
8—Testing three varieties of soy, soja, or Japanese beans	3
9—Testing eight varieties of flint and dent husking corn	8
Root Crops	
10—Testing three varieties of mangels	3
11—Testing two varieties of sugar mangels	2
12—Testing three varieties of Swedish turnips	3
13—Testing two varieties of fall turnips	2
14—Testing two varieties of carrots	2
Forage, Fodder, Silage and Hay Crops	
15—Testing field corn and soy beans grown separately and in combination	3
16—Testing Sudan grass and two varieties of Millet	3
17—Testing sunflower, sorghum and corn for fodder	3
18—Testing grass peas, vetches and soy beans	3
19—Testing rape, kale and field cabbage	3
20—Testing two varieties of biennial sweet clover	2
21—Testing two varieties of alfalfa	2
22—Testing hubam, biennial white and biennial yellow sweet clover	3
Culinary Crops	
23—Testing three varieties of field beans	3
24—Testing sweet corn for table use from different dates of planting	3
Fertilizers	
25—Testing low and high grade fertilizers and manure with oats and red clover	4
26—Testing fertilizers and manure in a definite rotation starting with potatoes followed by barley seeded with alfalfa. (Potatoes and manure to be furnished by the experimenter. Commercial fertilizers in 1926 and barley and alfalfa seed in 1927 to be furnished by the Experimental Union)	6
Miscellaneous	
27—Testing northern and southern grown seed potatoes	2
28—Testing two varieties of potatoes	2
29—Testing three grain mixtures for grain production	3
30—Testing three grain mixtures for fodder production	3
31—Testing O.A.C. No. 21 barley at three dates of seeding	3
32—Testing O.A.C. No. 144 oats, at three dates of seeding	3
33—Testing O.A.C. No. 3 oats at three dates of seeding	3
34—Testing O.A.C. No. 85 spring wheat at three dates of seeding	3
35—Testing O.A.C. No. 211 soy beans, sown broadcast and in rows	3
36—Testing Perfect Model swede turnips, thinned at three distances in the rows	3
37—Testing Yellow Leviathan mangels, thinned at three distances in the rows	3

The size of each plot is to be two rods long by one rod wide except for numbers 27 and 28, which is to be one rod square.

If you wish to conduct one of the thirty-seven co-operative experiments in field husbandry enumerated above, kindly fill out this blank form and return it as soon as possible.

The distribution will be confined to the choice varieties included in the various experiments. In filling out the blank form, therefore, it is neither necessary nor advisable to mention any particular variety or varieties.

All materials for experiments with instruction sheets enclosed will be sent by parcel post, *except for No. 26, which will be sent by express.*

Address all communications to

C. A. Zavitz, Agricultural College, Guelph, Ont.

Application for Material for an Experiment

I would like to conduct experiment number .... but if all the material for that experiment has been applied for before my application is received I select experiment number .... as my second choice. If the material for one of these experiments is forwarded to me, I will endeavour to:

1—Carry on the test according to the instructions received with the seed.

2—Exercise care and accuracy in the work, and

3—Report the results of the experiment as soon as possible after harvest, whether successful or not.

Weather Conditions

For each of the last twenty-seven years meteorological records have been taken by the Department of Physics at the Ontario Agricultural College. The total amount of precipitation in each of the six growing months from April to September, 1926, and for the average of the past twenty-seven years is given in the table below:

Period	April	May	June	July	Aug.	Sept.	Total
	inches	inches	inches	inches	inches	inches	inches
1926 (1 year)............	2.37	1.70	3.97	1.65	8.59	5.31	23.59
1900-1926 (27 years).......	2.57	2.99	2.89	3.51	3.21	2.78	17.95

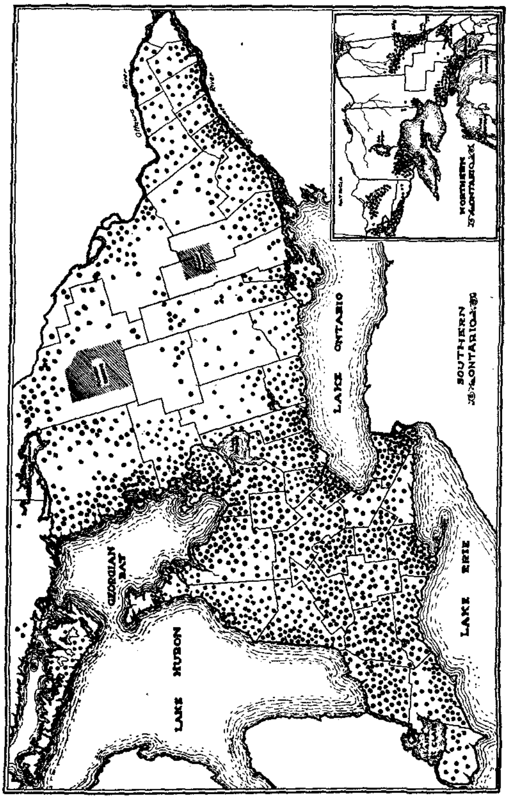
A perusal of this table shows that the total amount of rainfall for the six months, April to September, 1926, exceeded the average rainfall of the past twenty-seven years by more than five and one-half inches. With the exception of 1917, the rainfall for the six months, April to September, 1926, was greater than that for the same period in any year since 1899. The month of August in 1926 had the greatest rainfall of any of the six growing months in the past twenty-seven years. September in 1926 with a precipitation of more than five and one-quarter inches was the wettest September in twenty-seven years. The tabulated results for the six growing months in 1926 show that April, May and July had less than the average precipitation, and June, August and September much more than the average precipitation for the corresponding periods in the average of twenty-seven years. The excessive precipitation in the months of August and September made harvesting operations very difficult and in many cases lessened the yield and injured the quality of crops grown.

A Summary of Results of Co-operative Experiments

In 1886 co-operative experiments in Field Husbandry were started with twelve experimenters. In that year eight good reports were returned. This number gradually increased and results became more valuable from year to year. In 1926, 3,277 farmers throughout Ontario conducted co-operative experiments with farm crops. This is the largest number since the war and is almost double the number of experimenters four years ago.

Only those farmers who make personal application undertake this work. It is undoubtedly true that this voluntary co-operation on the part of the farmers has been the secret in making such a decided success of this particular work in the Province of Ontario. These tests are always conducted by the farmers themselves through the co-operation and guidance of the Field Husbandry Committee of the Experimental Union.

In 1926 reports of co-operative experiments which were received at the College were submitted to the same critical examination as in former years. This involves the separate and careful examination of all reports received by



Location of Co-operative Field Husbandry Experiments in Ontario in 1923.
A map for 1926 would show 1569 additional dots.

three members of the committee independently of each other. When necessary discussion followed regarding individual reports after which final decisions were made.

Only those reports which showed reliability in all the essential details of the work are used for the summary reports which are here presented.

The co-operative experimenters are men who have had a large amount of practical experience on the farm, many have had good educational advantages and a substantial training in experimental work. Many of these men have had training in short or long agricultural courses and in addition have successfully conducted co-operative tests on their own farms in previous years.

Accidents which were unavoidable, slight changes made in the standard size of the plots, unfavourable weather conditions or some other cause have prevented a considerable number of reports from being used in the summary. Many of these, however, have had their local value in furnishing important object lessons and in supplying good seed to the experimenters and through them to the various localities.

A number of the farm crops now grown most extensively throughout Ontario originated through the small lots of pure seed of leading varieties obtained by experimenters through the Field Husbandry Committee of the Experimental Union.

The table below gives the summary results in tabulated form of the popularity of the varieties as determined by the experimenters, and the yield of both straw and grain per acre of the different varieties of grain crops tested throughout Ontario in 1926. The yields of grain are given both in bushels and in pounds per acre. The different varieties in each class are arranged in order of their average yield in pounds of grain per acre.

Experiments	Varieties	Comparative value	Straw (tons)	Grain (bush.)	Grain (lbs.)
Oats (41 tests)	O.A.C. No. 144	100	1.53	53.80	1829
	O.A.C. No. 3	84	1.25	50.51	1717
	O.A.C. No. 72	88	1.41	50.01	1700
	Liberty Hulless	44	1.30	32.51	1105
Six-rowed barley and emmer (6 tests)	O.A.C. No. 21 barley	100	.89	46.65	2239
	Common emmer	94	.90	42.43	2037
Hulless barley (10 tests)	Guy Mayle	100	1.83	21.47	1288
	Black Hulless	92	1.77	20.72	1243
Spring wheat (8 tests)	O.A.C. No. 85	100	1.29	15.33	920
	Marquis	83	1.02	14.55	873
	Wild Goose	83	1.01	14.12	847
Winter wheat (11 tests)	O.A.C. No. 104	100	1.91	29.41	1765
	Imperial Amber No. 92	80	2.23	29.03	1742
	Dawson's Golden Chaff No. 61	100	1.71	28.62	1717
	Yaroslaf	64	1.76	24.26	1456
	Kharkov	54	1.53	21.49	1289
Winter rye and winter wheat (3 tests)	Winter rye	89	2.75	36.54	2046
	Winter wheat	100	1.07	30.89	1854
Winter emmer and winter barley (3 tests)	Winter emmer	100	.49	25.83	1240
	Winter barley	88	.45	23.88	1146
Buckwheat (2 tests)	Silver hull	100	1.42	46.67	2240
	Rough	67	1.62	39.17	1880
Field peas (21 tests)	O.A.C. No. 181	100	.78	24.09	1445
	Potter	79	.85	23.94	1436
	Early Britain	64	.80	23.16	1390
	Canadian Beauty	85	.91	22.17	1330
Field beans (7 tests)	Pearce's Improved Tree	100	1.42	27.52	1651
	Michigan No. 630425	76	1.12	25.19	1511
	American Wonder	71	1.40	22.61	1357
Soy beans (2 tests)	O.A.C. No. 211	100	2.80	14.67	880
	Ogemaw	83	1.08	14.33	860
	Early Yellow	83	1.60	13.33	800

The figures in the left-hand column under the heading comparative value are made up from the direct answers given by the experimenters. It is their opinion of the relative worth of these varieties under their own peculiar conditions. Comparative value is sometimes referred to as popularity.

Varieties of Oats. In 1926 four varieties of oats were included in the co-operative experiments. The O.A.C. No. 72 and the O.A.C. No. 3 have been used in these experiments in each of the past fourteen years, the Liberty for six years and the O.A.C. No. 144 for four years. In fourteen years' experiments with the first two named varieties there were 939 good reports of successfully conducted experiments received. The average yield in bushels per acre for this whole period was 48.6 for the O.A.C. No. 72 and 43.6 for the O.A.C. No. 3. In studying this comparison it should be remembered that the latter variety matures about ten days earlier than the former and it has been observed, as a result of the co-operative experiments, which cover a period of more than a third of a century, that the highest average yields of oats per acre are obtained from late rather than from early maturing varieties. The O.A.C. No. 3 variety is a very thin-hulled variety, having on the average about four per cent. less than the O.A.C. No. 72. The experiments conducted at the College for a period of fifteen years have shown that the O.A.C. No. 3 has outyielded the Alaska variety by several bushels per acre. The Liberty variety is a hulless oat which was originated by cross-fertilization at the Central Experimental Farm at Ottawa. This variety has given a higher yield per acre than any other variety of hulless oats tested at Guelph and during the time it has been under test has made a fair record in the co-operative experiments throughout the Province. When the percentage of hull is considered there is not a great deal of difference in production between the Liberty hulless and the O.A.C. No. 3 varieties. The O.A.C. No. 3, however, is an earlier maturing variety than the Liberty.

For the last four years the O.A.C. No. 144, which is a new variety originated at Guelph, has made an outstanding record throughout Ontario as will be seen from results contained in the following table:

Varieties	Straw (tons)		Grain (bus.)		Grain (lbs.)	
	1926	Average 4 years	1926	Average 4 years	1926	Average 4 years
O.A.C. No. 144	1.53	1.53	53.80	52.57	1829	1787
O.A.C. No. 72	1.41	1.40	50.01	48.66	1700	1654
O.A.C. No. 3	1.25	1.11	50.51	43.67	1717	1485
Liberty Hulless	1.30	1.29	32.51	33.27	1105	1131

The results contained in this table are compiled from the average of more than 300 tests conducted on as many farms situated in nearly every county and district in the Province of Ontario.

Of all the varieties, strains and hybrids of oats grown in the Experimental Department, the O.A.C. No. 144 has in the average of the last three years given the highest yield of grain per acre. This variety is now one of the varieties listed as eligible for registration in Canada by the Canadian Seed Growers' Association.

The O.A.C. No. 144 variety of oats had its origin from a selection taken in 1912 from among plants of the O.A.C. No. 72 variety. It is decidedly different, however, from the latter and seems quite distinct from any other of three hundred

or more named varieties of oats which have been tested for five years and upwards at the Ontario Agricultural College.

The O.A.C. No. 144 is a tall, vigourous, broad-leaved, exceptionally stiff-strawed late-maturing variety of oats which possesses a spreading head and long slightly brownish white grain which is practically free from awn and which produces a heavy yield of both grain and straw of good quality.

The eight varieties of oats now eligible for registration by the Canadian Seed Growers' Association have been under experiment at the Ontario Agricultural College from nine to thirty-seven years. In the nine years' experiments the O.A.C. No. 144 variety has produced a larger yield of grain per acre per annum and has possessed stiffer and stronger straw than any of the other varieties. The following table gives the average of nine years' results of the varieties of oats now eligible for registration in Canada:

	Average Results for 9 Years				
				Yield per Acre	
	No. of Days to Mature	Height in Inches	Percentage of Hull	Straw (tons)	Grain (bushels by weight)
O.A.C. No. 144	111.3	47.4	29.8	2.49	89.2
O.A.C. No. 3	99.8	38.3	25.5	1.88	86.5
O.A.C. No. 72	111.0	45.5	29.2	2.12	82.7
Gold Rain	108.4	42.1	29.7	1.95	82.7
Abundance	108.6	42.7	29.1	2.03	80.8
Banner	111.1	43.9	29.9	2.09	78.5
Victory	108.9	41.9	29.4	1.87	77.5
Alaska	99.6	40.4	23.9	1.65	68.4

The O.A.C. No. 144 which only recently was introduced into Ontario is now being grown by many farmers and being included in the Field Crop Competitions over Ontario. Increasing demands for this variety indicate that it will, before long, become the leading variety of oats in Ontario.

The O.A.C. No. 72 variety which for a number of years has been widely grown in Ontario has made a very interesting record in the Standing Field Crop Competitions throughout the Province. Over a period of eight years, out of a total of 1,108 first prizes awarded for fields of oats, each entry of at least five acres, the O.A.C. No. 72 received 565; Banner, 307; Abundance, 21; Gold Rain, 13, and Victory, 1. The remaining 201 prizes were divided amongst varieties not eligible for registration. It will be noticed that early maturing varieties could not enter this competition satisfactorily.

O.A.C. No. 21 Barley and Common Emmer. The O.A.C. No. 21 barley is not only the most grown variety in Ontario, being grown to the exclusion of almost all other varieties but this variety is the most extensively grown barley in Canada at the present time. Common emmer, which is a species of wheat but whose uses more nearly resemble barley than those of common wheat, has been widely advertised and has proven itself to be a good yielder of grain. In the experiments at the College, Common Emmer has proven to be a strong competitor of the largest yielding varieties of oats and barley in grain production. In the co-operative experiments emmer was outyielded by barley in 1926 by an average of 202 pounds of grain per acre. These two crops have now been under competi-

tion throughout Ontario in each of the past fourteen years during which time 158 distinct experiments were successfully conducted. In the average of this period, barley surpassed emmer in yield of grain per acre per annum by 282 pounds. The O.A.C. No. 21 barley, which was originated at Guelph, it is estimated, has increased the acre yields of barley in Ontario to the extent of at least $40,000,000.

Hulless Barley. Of the varieties of hulless barley which have been tested at the College, the Guy Mayle and Black Hulless have been two of the best. These two varieties have been distributed to Ontario farmers for co-operative experiments in each of twenty-three years, during which time there has been a total of 270 successfully conducted experiments. In the average of the twenty-three-year period the Guy Mayle produced 23.9 and the Black Hulless 23.3 bushels per acre. Hulless barleys as a class are rather weak in the straw. This grain has a standard weight of sixty pounds per bushel.

Spring Wheat. For a period of fourteen years the Wild Goose and Marquis varieties of spring wheat have been successfully tested throughout Ontario on 165 farms. The average yield per acre of the former being 20.3 and of the latter 19.2 bushels. The Wild Goose is a hardy flinty wheat and belongs to the durum species. It is better suited for the manufacture of macaroni than for bread production. The Marquis variety, which is now the most extensively grown spring wheat in Ontario, originated from a cross of Red Fife and Hard Red Calcutta. To Dr. Charles E. Saunders, formerly of the Experimental Farm at Ottawa, most of the credit is due for the development and introduction of this wonderful variety of spring wheat. The O.A.C. No. 85 variety of spring wheat has been used in the co-operative experiments for the last three years. The following table gives the yield per acre of three varieties of spring wheat for each of the three years and for the average of the period:

Varieties	Yield per Acre (Bushels)			
	1924	1925	1926	Average 3 years
O.A.C. No. 85	31.1	21.1	15.3	22.5
Wild Goose	26.3	18.5	14.1	19.6
Marquis	24.3	19.3	14.6	19.4

The O.A.C. No. 85 variety of spring wheat was originated at Guelph by crossing the Red Fife and Herison Bearded varieties. It is a red-grained wheat of good quality, has a bearded head and white chaff. In the average of thirteen years' experiments at the College, with the exception of two varieties, it has produced the highest average yield of grain per acre of twenty varieties of spring wheat grown under similar conditions. The Arnautka and Roumania, two durum varieties, slightly surpassed this variety in yield of grain per acre in the average of the thirteen-year period. Attention is called to the results in the above table which show that the O.A.C. No. 85 surpassed both the Wild Goose and Marquis varieties in each of the three years' co-operative tests.

Winter Wheat. Eleven successfully conducted co-operative tests were made with varieties of winter wheat in Ontario in 1926. The O.A.C. No. 104 outyielded the other four varieties included in the test. These five varieties have

now been used for co-operative experiments in each of nine years and the average results in yield of grain per acre, which includes 202 successfully conducted experiments in different parts of the Province, are as follows:

Varieties	Yield per Acre (Bushels)	
	1926	Average, 9 years
O.A.C. No. 104	29.41	28.33
Dawson's Golden Chaff (O.A.C. 61)	28.62	27.25
Imperial Amber (O.A.C. 92)	29.03	26.46
Yaroslaf	24.26	22.52
Kharkov	21.49	21.49

In each of the nine years' co-operative experiments, with the exception of 1921 when it came second, the O.A.C. No. 104 variety of winter wheat produced the largest yield of grain per acre. The O.A.C. No. 104 was originated at Guelph by crossing the Dawson's Golden Chaff and the Bulgarian varieties. It is a white wheat with a beardless head and white chaff. The translucency of this variety is higher than the Dawson's Golden Chaff variety of winter wheat. The Dawson's Golden Chaff (O.A.C. No. 61), which occupies second place in yield per acre in the table in the average of the nine years, was outyielded by the Imperial Amber (O.A.C. 92) in 1926 but the popularity of this variety with the experimenters was greater than the Imperial Amber (O.A.C. 92). The Dawson's Golden Chaff (O.A.C. 61) was a selection made at Guelph from a single plant of the old variety of Dawson's Golden Chaff.

Winter Rye and Winter Wheat. In each of the last eleven years one of the best varieties of winter rye and one of the best varieties of winter wheat have been compared in co-operative experiments. In 1920, 1921, 1922, 1923, 1924, 1925 and 1926 the Rosen rye and the O.A.C. No. 104 winter wheat were the varieties used, and in the years 1915, 1916, 1918 and 1919 the Petkus rye and the Imperial Amber winter wheat were the varieties included for the test of the two classes of crops. In ten out of the eleven years winter rye surpassed winter wheat in pounds of grain per acre when the two crops were grown side by side under uniform conditions and tested on forty-one farms located in different parts of the Province. It will be noted, however, that although winter rye in 1926 out-yielded winter wheat by 192 pounds per acre the winter wheat was considered of greater value by the experimenters.

Winter Emmer and Winter Barley. These two crops are only grown to a limited extent in Ontario. The following table gives some valuable information on the comparative yields of the two crops for 1926 and for the average of four years:

	Yield of Grain per Acre (Pounds)				
	1919	1920	1922	1926	Average
Winter Barley	1580	3040	2235	1146	2000
Winter Emmer	*1720*	*1760*	*2066*	*1240*	*1697*

Winter barley has shorter straw and produces less straw per acre than winter emmer. In yield of grain in the average of the four years indicated in the table it outyielded winter emmer by an average of 303 pounds per acre. In relatively mild winters with good snow protection winter barley has, in the experiments at the College and the co-operative experiments over Ontario, proven itself to be a larger yielder of grain.

Spring Rye. No successful reports of experiments conducted with varieties of spring rye were received in 1926. Two varieties, namely, the O.A.C. No. 61 and Common spring rye have been under test in each of fourteen years previous to this year. In the average of this period the O.A.C. No. 61 variety produced 22.9 bushels and the Common variety 20.2 bushels per acre. The O.A.C. No. 61 variety of spring rye was originated at Guelph. In 1901 Dr. Zavitz, when on a visit to Germany, secured from one of the greatest rye breeders in that country a small quantity of choice seed of his best variety. Although this proved to be a winter rye some plants from spring sowing produced seed. Selections were made from these individual plants and the outstanding one was the original source of what is now the O.A.C. No. 61 variety of spring rye.

Buckwheat. Two varieties of buckwheat, namely the Rough and Silver Hull, have been used in the co-operative experiments since 1908. No good reports were received in 1914 and 1923. The number of good reports of successfully conducted experiments was 2 for 1926 and 57 for the whole period. The following table gives the average yields per acre of these two varieties for 1926 and for the sixteen-year period:

Varieties	Yield per Acre (Bushels)	
	1926	Average, 16 years
Rough	39.2	27.3
Silver Hull	46.7	22.7

Rough buckwheat is largely grown in the Maritime Provinces but only to a limited extent in Ontario. This variety is a large yielder of grain which is not quite as good either in appearance or quality as that produced by the Silver Hull. Rough buckwheat seeds have a rough surface and the hulls are somewhat thicker than those found in the Silver Hull variety. The flour produced from Rough buckwheat has a yellowish tinge and a slightly bitter flavour.

Field Peas. A total of 132 successfully conducted co-operative tests have been made during the past five years with four varieties of field peas. The average yields in bushels per acre for 1926 and for the whole period are as follows:

Varieties	Yield per Acre (Bushels)	
	1926	Average, 5 years
O.A.C. No. 181	24.09	24.91
Potter	23.94	23.83
Early Britain	23.16	22.88
Canadian Beauty	22.17	22.55

In each of four years the O.A.C. No. 181 variety gave the highest yield per acre and in 1924 was second in yield per acre. In 1926, although the Canadian Beauty variety was lowest of the four varieties tested in yield per acre, it was next in popularity to the O.A.C. No. 181 variety.

The O.A.C. No. 181 variety of field peas was originated at Guelph by crossing the Prussian Blue and White Wonder varieties. This is an early maturing variety with a medium length of vine and with a small slightly wrinkled pea of good quality and appearance. In the average of nine years' experiments at the College, during which time seventeen varieties have been under test, the O.A.C. No. 181 produced the highest yield of grain per acre. In eight of the nine years the O.A.C. No. 181 ranked first in yield of grain per acre. The second, third and fourth highest yielding varieties for the nine-year period were all new varieties originated at Guelph by hybridization.

Field Beans. Three varieties of field beans have been successfully tested in the co-operative experiments on sixty-six Ontario farms in the past seven years. The average result of this period shows that the Pearce's Improved Tree produced 25.8 bushels; the Michigan No. 630425, 24.1 bushels and the American Wonder 22.9 bushels per acre. The Pearce's Improved Tree bean gave the highest average yield per acre in six out of the seven years the test was conducted. This latter variety is a large white rather flat oval-shaped bean. The other two varieties are both small white pea beans. All three of these varieties are of good quality. The Pearce's Improved Tree bean, however, ripens somewhat later than the other two varieties.

Soy Beans. This crop is grown in Ontario to a limited extent both for grain and for fodder. Those varieties which are early enough in maturing to produce seed in the central part of the Province are usually small yielders of green fodder. It has been the aim of the Field Husbandry Committee to distribute varieties for co-operative experiments which possessed plants of good size and matured sufficiently early to produce a good seed yield. In 1926 the average yields of grain per acre in the co-operative tests were as follows: O.A.C. No. 211, 14.7 bushels; Ogemaw, 14.3 bushels, and Early Yellow, 13.3 bushels. In the average of fourteen tests conducted in the last four years the O.A.C. No. 211 gave 17.0 bushels of grain per acre. The O.A.C. No. 211 variety has produced the highest yield of grain, and with another variety the highest yield of fodder of all the varieties grown at the College for the last five years. This variety, which is a yellow-grained flattened oval-shaped soy bean, was accepted as eligible for registration by the Canadian Seed Growers' Association at their annual meeting in June, 1925.

Grains Sown at Different Dates

A large number of experiments have been conducted at the College in sowing different classes of farm crops at different dates and the results of these have been of particular value. The tests for several years show that the greatest yield per acre and the best quality of grain was obtained when spring wheat, barley, oats and peas were sown early in the spring and in the order here mentioned.

In 1925 and 1926 co-operative experiments were conducted in Ontario in the sowing of early oats, late oats and spring wheat at each of three different dates. The instructions given with the experiment were to sow the first date of seeding, as soon as the land could be properly prepared and allow two weeks between each date of sowing. Naturally, because of weather conditions, some

variation occurred in the length of time allowed between the different dates of seeding. The following table gives the average results in dates of seeding and yield per acre of successfully conducted experiments on six farms with early oats, twenty-one farms with late oats and on five farms with spring wheat in the average of the two-year period:

Early Oats		Late Oats		Spring Wheat	
Average dates of Seeding	Average Yield (Bushels per Acre)	Average dates of Seeding	Average Yield (Bushels per Acre)	Average dates of Seeding	Average Yield (Bushels per Acre)
April 20th	52.2	May 1st	41.3	April 26th	12.9
April 30th	41.2	May 13th	34.2	May 8th	11.6
May 11th	32.2	May 24th	27.0	May 20th	8.9

The experiments with early oats were conducted on farms in two different counties, with late oats on farms in fourteen different counties and with spring wheat on farms in four different counties. These experiments will be continued in future years when more definite and conclusive results will be obtained.

A co-operative experiment was conducted for the first time this year in sowing barley at different dates. The first average date of seeding, which was May 3rd, gave an average yield of 41.7 bushels; the second average date of seeding, which was May 15th, an average of 45.8 bushels, and the third average date of seeding, which was May 27th, an average of 34.2 bushels per acre.

In the dates of seeding experiment with winter wheat, which was conducted in 1926 for the first time, winter wheat sown on the average date of September 4th produced 22.0 bushels, and winter wheat sown on the average date of September 18th produced 20.0 bushels, and winter wheat sown on the average date of October 2nd produced 13.8 bushels per acre. The above tests with winter wheat were conducted on farms in Norfolk, Grey, Huron and Simcoe counties.

Methods of Seeding Soy Beans

For the past two years a co-operative experiment has been conducted in sowing soy beans broadcast and in rows which were twenty-two inches apart. Seed was sown at the rate of a bushel and a half in the former and one-half bushel per acre in the latter method. In the average of three successfully conducted tests in the two years, soy beans in rows produced an average yield of grain of 18.0 bushels per acre and from the broadcast method a yield of 13.3 bushels per acre.

Grains Grown in Combination for Grain Production

Nine years ago a co-operative experiment was started for the purpose of ascertaining whether or not the addition of one-half bushel of goose wheat per acre or one-half bushel of Golden Vine peas per acre to a mixture of one bushel of oats and one bushel of barley would be of any advantage in producing a larger yield of grain on the farms of Ontario. No reports from successfully conducted experiments were received in 1918, 1924 or 1926. In the average of six years in which thirteen reports of successfully conducted experiments were received, one bushel of oats and one bushel of barley, by weight, produced 2,047 pounds; one bushel of oats, one bushel of barley and one-half bushel of Golden Vine peas,

by weight, produced 1,949 pounds; and one bushel of oats, one bushel of barley and one-half bushel of Goose wheat, by weight, produced 1,834 pounds per acre. These results quite closely parallel those of experiments conducted at the College. Results both at the Ontario Agricultural College and in the co-operative experiments over Ontario have shown that it is very difficult to use any combination of grains which will give a higher yield per acre than a mixture of oats and barley. In order to obtain the greatest returns from growing grains in mixtures it is necessary not only to use the right proportion of oats and barley but varieties best adapted for the purpose. The O.A.C. No. 21 barley and O.A.C. No. 3 oats have given the greatest yields per acre of any barley or oat varieties which have been grown in mixtures for grain production.

Varieties of Corn for Husking

The past season has been an unfavourable one for ripening corn and no successfully conducted reports were received on this crop. In 1916 a co-operative experiment was started in the testing of seven varieties of corn recommended for growing in Ontario by the Ontario Corn Growers' Association. In the average of nine years fifty-nine successfully conducted tests were made with varieties of Indian corn for grain production with results as follows: Golden Glow, 63.8 bushels; White Cap Yellow Dent, 59.5 bushels; Bailey, 58.7 bushels; Wisconsin No. 7, 58.5 bushels; Salzer's North Dakota, 55.3 bushels; Longfellow, 53.0 bushels, and Compton's Early, 51.4 bushels per acre. It will be noted in these results that the four highest yielders of grain were Dent corns, and the three lowest yielders were Flint corns.

In addition to the seven varieties mentioned, the Gold Nugget variety of flint corn has been used in the co-operative experiments for a number of years. In yield of grain per acre this variety ranked second in 1925, first in 1923, and sixth in 1922.

Dates of Planting Sweet Corn

The yield per acre and the quality for table use of between fifty and sixty varieties of sweet corn have been compared at the College and a few of the very best have been included in the co-operative tests. The varieties that have been used the most extensively in the experiments throughout Ontario have been the Golden Bantam, the Stowell's Evergreen, the Malakhoff and White Cory. In each of the years in which it was tested the Golden Bantam variety was reported by the experimenters as the most desirable to grow for table use. In each of the six years previous to 1920 only two varieties were selected for distribution, namely, the Golden Bantam of the early maturing and the Stowell's Evergreen of the late maturing sweet corns. The Golden Bantam variety proved to be more popular with the experimenters and produced a greater number of ears of corn of better quality than the Stowell's Evergreen. The former variety matured about ten days earlier than the latter. The Golden Bantam is now very widely grown in Ontario. In each of the past seven years a co-operative experiment has been conducted in planting the Golden Bantam on three different dates. The seed was supplied from the College and each experimenter advised to plant the corn on three different dates, allowing two weeks to remain between each two dates of planting.

The following table gives the dates of planting, the time at which ears were ready for table use and the number of good ears from fifty hills for each date of planting in 1926 and for the average of the past seven years:

Planted		Ears Ready for Use		Number of Good Ears from 50 Hills	
1926	Average 7 years	1926	Average 7 years	1926	Average 7 years
May 23rd	May 19th	Aug. 24th	Aug. 15th	147	158
June 3rd	June 1st	Sept. 1st	Aug. 26th	149	153
June 15th	June 13th	Sept. 12th	Sept. 8th	134	137

The above table represents the average of eleven tests in 1926 and of sixty-eight tests in the seven-year period. The dates indicated above are the averages of the actual dates on which the experimenters planted their sweet corn and on which the ears were ready for use. It will be noted that the Golden Bantam sweet corn can be planted as late as June 13th with good satisfaction, although the crop planted on this date is not as prolific as from earlier plantings. In one's garden it is often a good plan to plant a small quantity of the Golden Bantam sweet corn even earlier than May 17th or 18th. In case of injury by early frost, the crop can be planted again without much labour or loss. With proper sequence of plantings there should be no difficulty in having the Golden Bantam sweet corn for table use in the latter part of July, the whole of August and part of September.

Field Roots and Fodder Crops

In 1926 co-operative experiments were conducted with mangels; sugar mangels; swede turnips; fall turnips; field carrots; rape, kale and cow cabbage; grass peas, hairy vetches and soy beans; sunflowers, field corn; sorghum; and millet. The number of good reports received of successfully conducted experiments this year was twenty-eight, which was four more than in 1925. The average results of successfully conducted tests with field roots and fodder crops are presented in the following table:

Experiments	Varieties	Yield per Acre (tons)
Mangels (11 tests)	Sutton's Mammoth Long Red	26.70
	Keith's Prize Taker Yellow Globe	25.80
	O.A.C. No. 2 Strain Yellow Leviathan	25.20
Sugar Mangels (3 tests)	Rennie's Tankard Cream	33.52
	Bruce's Giant White Feeding	27.56
Swede Turnips (3 tests)	Superlative	21.52
	Perfect Model	21.28
	Canadian Gem	20.09
Field Carrots (4 tests)	Steele, Briggs' Improved Short White	23.35
	Rennie's Mammoth Intermediate Smooth White	22.26
Grass Peas, Hairy Vetches and Soy Beans (5 tests)	Hairy Vetches	6.52
	Grass Peas	5.36
	O.A.C. No. 211 Soy Beans	3.80
Sunflowers, Sorghum and Field Corn (1 test)	Mammoth Russian	13.80
	White Cap Yellow Dent	11.04
	Early Amber Sugar Cane	3.84
Millet and Sudan Grass (1 test)	O.A.C. No. 92	9.12
	Japanese Panicle	8.78
	Sudan Grass	7.20

Mangels. The results for 1926 show that there was little difference in the yield per acre of the three varieties under test, the Sutton's Mammoth Long Red surpassing the O.A.C. No. 2 Strain of Yellow Leviathan by 1½ tons per acre. The three varieties mentioned in this table have been tested in co-operative experiments for each of the past eight years with average yields per acre as follows: Sutton's Mammoth Long Red, 29.7 tons; Yellow Leviathan (O.A.C. No. 2), 29.0 tons; Keith's Prize Taker, 28.2 tons. These varieties each represent a different type of mangels, first the long, second the intermediate, and third the globe.

A co-operative experiment was conducted this year for the first time in thinning mangels at different distances apart in the rows. The yields from the different thinnings follow: Mangels, thinned 8 inches apart, 17.5 tons; Mangels, thinned 4 inches apart, 17.4 tons; Mangels, thinned 12 inches apart, 16.8 tons.

Sugar Mangels. This class of roots, which is also known as stock-feeding sugar beets, is intermediate between the mangel and true sugar beet, and has been grown considerably in recent years as a feed for farm stock, especially for dairy cattle. In the average of twelve years' results in which there were sixty-two good reports received, the Rennie's Tankard Cream gave an average yield of 25.2 tons per acre, and Bruce's Giant White Feeding an average of 25.3 tons per acre.

Swede Turnips. There has been a large amount of interest in the production of swede turnips in Ontario in recent years, not only for the production of feed for stock but also for table use, and particularly for export to the United States. The variety, which has made the highest score as a shippiug turnip as determined in the experiments at the College is the Perfect Model which has been grown at the College since 1915. In the co-operative experiments in 1924 in the average of nine successfully conducted tests the Perfect Model surpassed the Bronze Top and the Superlative. In 1925 the Perfect Model held an intermediate position in yield of roots per acre, the highest yielder in the average of five successfully conducted tests being the Superlative (elephant type), and the lowest the Canadian Gem. In 1926 the Perfect Model once more held an intermediate position in yield per acre being surpassed by Superlative by .24 tons per acre in the average of three successfully conducted tests. The Canadian Gem is a well-shaped root and comes next to the Perfect Model in shape and quality for shipping, but is a smaller yielder per acre than this variety.

In 1926 a co-operative experiment was conducted for the first time in thinning swede turnips at different distances apart in the rows. In the average of five successfully conducted experiments, yields from the different thinnings were as follows: 4 inches apart, 25.2 tons per acre; 8 inches apart, 23.5 tons per acre; 12 inches apart, 20.7 tons per acre. Experiments conducted at the College over a period of several years in thinning mangels and swede turnips at different distances apart in the rows show that there is little to be gained from thinning these roots at a distance in the rows greater than ten to twelve inches apart. Where roots are thinned at greater distances less yield per acre and poorer quality have invariably been the result.

Field Carrots. In the average of four successfully conducted tests in 1926, the Steele Briggs' Improved Short White variety produced a yield of 1.09 tons more than the Rennie's Mammoth Intermediate Smooth White. These two varieties resemble each other closely, and results in previous years have shown little difference between the two varieties in yield per acre.

Grass Peas, Hairy Vetches and Soy Beans. For nineteen years in succession an experiment has been conducted throughout Ontario in comparing hairy vetches, grass peas and common spring vetches for fodder production. The results for this whole period show the following average yields of green fodder per acre per annum: hairy vetches, 8.6 tons; grass peas, 7.5 tons, and common spring vetches, 6.7 tons. These are all leguminous crops whose feeding value is high. It is unfortunate that the seed of hairy vetches is expensive and as a consequence the crop which in the co-operative experiments has given the highest average yield per acre is grown in Ontario to quite a limited extent. In 1923 soy beans replaced common spring vetches in this experiment and outyielded the other two varieties included in the test. In 1925 only two reports were received and these show little difference between the three crops in average yield per acre. In 1926 in the average of five successfully conducted experiments, soy beans gave the lowest yield per acre of the varieties included in the test. The highest yield was produced by the hairy vetches with a yield of 6.5 tons per acre.

Sunflowers, Sorghum and Field Corn. Mammoth Russian sunflowers, White Cap Yellow Dent corn and Early Amber Sugar sorghum have been used in the co-operative experiments in each of the past six years. In 1926, as well as in the average of the six years' results, the sunflowers gave the highest and the sorghum the lowest yields per acre. Sunflowers are grown in Ontario to a limited extent alone and for mixing with corn for silage. This crop can be successfully grown in the northern sections of the Province where the season is too short for Indian corn. In favourable seasons on a warm sandy loam type of soil, sorghum may be grown in Ontario with successful results.

Millets and Sudan Grass. Japanese Panicle millet, O.A.C. No. 92 millet and Sudan Grass were tested in the co-operative experiments in 1926, the O.A.C. No. 92 variety of millet surpassing the Japanese Panicle by .44 of a ton and the Sudan Grass by 1.92 tons per acre. In the average of five years, during which time the Japanese Panicle millet and Sudan Grass have been included in the co-operative experiments, the average yields per acre were as follows: Japanese Panicle millet, 8.50 tons of green crop and Sudan Grass, 6.70 tons of green crop.

Varieties of Alfalfa

Co-operative experiments have been conducted with different varieties of alfalfa for a period of twenty-seven years, during which time seed has been sent to each of 2,587 Ontario farmers for co-operative tests on their own farms. A definite co-operative experiment has been conducted with the Ontario Variegated and the Grimm varieties on each of 2,048 farms within the past sixteen years. Each experimenter was asked to so locate the plots that they might remain undisturbed for a number of years. A considerable number of these experimental plots were sown as far back as 1911 and still remain unbroken, and the results have proven to be both interesting and valuable. In November, 1925, a blank form was sent to each experimenter asking for information regarding their experiment. From over three hundred replies received results were summarized. In answer to the question as to which of the two varieties gave the better results in the local test, it is interesting to note that of the fourteen years from 1911 to 1924, inclusive, the majority of the experimenters favoured the Ontario Variegated in the years 1912, 1913, 1916, 1918, 1920, 1923 and 1924, and the majority favoured the Grimm in each of the other seven years. Of the 188 who answered

this question, ninety-five preferred the Grimm and ninety-three the Ontario Variegated. In reply to the question as to the most extensively grown varieties of alfalfa in the various districts, 119 farmers mentioned Ontario Variegated, sixty-five Grimm, four Common, one Turkestan, while three others mentioned Northern Grown.

A large number of varieties and strains secured from various sources throughout the world have been tested at different times at the Ontario Agricultural College. In 1909 one test of sixty-eight plots and another of seventy-one plots were started at the College. These plots produced crops for a period of ten years. Other experiments have been conducted for shorter and longer periods of time. The Ontario Variegated and the Grimm varieties have proven to be the most suitable for Ontario conditions when hardiness of plants, yield of green fodder, hay and seed are taken into consideration. Ontario is fortunate in having this year a large supply of high quality seed of the Ontario Variegated variety of alfalfa which can be obtained at a moderate price. The high quality of this seed was demonstrated this year when Ontario growers of Ontario Variegated alfalfa captured the first nine prizes at the International Stock, Hay and Grain Show at Chicago. The farmers of the Province have a better opportunity than ever before of securing good seed at a reasonable price. The demand for this hardy alfalfa seed is increasing in the United States. The alfalfa production of Ontario has trebled in the last ten years and doubled in the last three years. Within the next three years the total area of alfalfa in Ontario is likely to exceed 1,000,000 acres.

Varieties of Potatoes

The potato crop is one of the most stable crops grown in the Province, its area showing little variation from year to year. In order to reduce the number of varieties grown in Ontario and thus increase the yield per acre as well as the quality, emphasis has been placed in recent years on the production of the Irish Cobbler of the medium early and the Green Mountain and the Dooley of the late maturing varieties. These varieties were selected because of their value as commercial varieties and because each variety represented a group of varieties somewhat similar in shape of tuber.

In the co-operative experiments with potato varieties only two, namely, the Green Mountain and the Irish Cobbler, have been distributed since 1918 with the exception of the past year when the Dooley variety was included in this test. The Green Mountain and Irish Cobbler varieties have, therefore, been included in the co-operative experiments in each of the past nine years. In order to obtain the most reliable information possible in these tests, seed of each variety has been obtained each year from Northern Ontario and from Southern Ontario. In 1926 reports of successfully conducted experiments were received from 165 experimenters. The following table gives the average results of these experiments in each of the past nine years and of the whole period:

	Average Yield of Total Crop per Acre (Bushels)									
	1918	1919	1920	1921	1922	1923	1924	1925	1926	Average
Green Mountain	129.5	132.5	301.5	176.1	193.0	231.0	257.2	200.5	226.5	205.3
Irish Cobbler	134.3	111.1	271.5	153.4	171.9	185.8	208.2	159.0	177.0	174.7

In eight of the nine years the Green Mountain gave a higher yield of potatoes per acre than the Irish Cobbler. The difference in favour of the Green Mountain

was an average of 49½ bushels per acre in 1926 and of 31 bushels per acre in the average of the nine-year period. When it is taken into consideration that in the nine years there has been a total of 1,168 good reports of successfully conducted experiments and also that each year the test was made between the two varieties, the seed was obtained from Northern Ontario as well as from Southern Ontario, we realize that the results presented here should carry much weight. The seed potatoes used in this experiment in each of the years were as free from disease and as true to type as it was possible to obtain.

The Green Mountain variety had on the average of the nine-year period about twice as much rot as the Irish Cobbler variety. The average amount of rot for the Green Mountain variety, however, was less than two per cent, for the whole period. The percentage of small potatoes (potatoes less than 1½ inches in diameter) of the Irish Cobbler variety was 12.5 and of the Green Mountain variety 10.0.

In 1926 in the average of 165 successfully conducted experiments, which was the largest number since 1914, the yields of potatoes per acre were as follows: Green Mountain, 226.5 bushels; Dooley, 190.1, and Irish Cobbler, 177.0 bushels. The Dooley variety produced a higher percentage of marketable potatoes than either the Green Mountain or the Irish Cobbler varieties.

Northern and Southern Grown Seed Potatoes

For a period of seven years an experiment was conducted at the College in testing seed potatoes obtained from different sources. These sources were mainly Southern Ontario, Northern Ontario and New Brunswick. Seed potatoes which were obtained in the Muskoka District, near the Muskoka Lakes, produced considerably higher yields per acre than those which were obtained from Southern Ontario and slightly higher yields than those obtained from the Province of New Brunswick. In later years potatoes which have been obtained from the Rainy River, Algoma and Thunder Bay Districts have given good results for seed purposes. Whether these increased yields are due to the immaturity of the seed, greater freedom from disease of the northern-grown seed stock or by other selection factors has been receiving special attention for a number of years.

In 1926 two varieties of potatoes were obtained from Southern Ontario and the same two varieties obtained from Northern Ontario. The seed procured had been inspected in the field and was as free as possible from diseases, especially those of leaf roll and mosaic. In 1926 there were in all eighty-five good reports of successfully conducted experiments received. The table below gives the average results of this experiment in each of nine years and also for the average of the nine-year period which includes 581 separate experiments:

	Average Yield of Potatoes per Acre (bushels)									
	1918	1919	1920	1921	1922	1923	1924	1925	1926	Average
Northern Ontario....	142.8	134.6	292.6	168.1	187.2	195.3	209.3	169.7	217.1	190.7
Southern Ontario....	123.9	128.5	279.8	163.9	183.2	187.7	198.8	162.4	198.8	180 8

This table presents striking results. It will be noticed that in every one of the nine years the northern-grown seed produced a greater yield per acre than seed which was grown in Southern Ontario, the average difference for the whole period being 9.9 bushels per acre. These variations in yield are less than they

were in the early years of a corresponding experiment conducted at the College which is most likely due to the fact that in the College experiment there were no inspectors available for examining the potatoes grown in the fields in Northern and in Southern Ontario and undoubtedly more disease was present in the seed stock. In the last nine years the seed used for the co-operative experiment was from inspected fields and was comparatively free from disease of all kinds.

Fertilizers and Manures with Farm Crops

For a period extending over forty-one years' co-operative experiments with manures and fertilizers with farm crops have been conducted in Ontario. These experiments for the first four or five years were somewhat of a preliminary nature. Since 1889 the experiments have been conducted under a general scheme and much valuable information has been secured. The summary results of many of these experiments couducted through the medium of the Experimental Union in past years may be secured in booklet form by writing to the Experimental Union Secretary, Agricultural College, Guelph, Ontario.

In 1926 co-operative experiments were conducted with manures and fertilizers on winter wheat, oats and potatoes. In one set of tests the application of manures and fertilizers with winter wheat was made in the autumn and with another set the application was made in the spring. The following table gives a condensed summary of the results of co-operative experiments with manures and fertilizers on different crops:

Kind of Fertilizer used	Fert-ilizer per acre	Average Yield per Acre							
			Fodder Corn					Winter Wheat Fertilizers applied	
		Oats	*Total*	*Ears*	*Man-gels*	*Swede tur-nips*	*Pota-toes*	*Aut-umn*	*Spring*
	Exact Wt.	5 yrs. 74 tests	8 yrs. 47 tests	8 yrs. 41 tests	5 yrs. 41 tests	5 yrs. 18 tests	5 yrs. 98 tests	8 yrs. 22 tests	6 yrs. 15 tests
	lbs.	bus.	tons	tons	tons	tons	bus.	bus.	bus.
Nothing	......	38.9	8.2	2.7	20.6	19.6	129.2	18.9	22.3
Nitrate of Soda	160	46.3	9.4	3.1	26.5	22.5	153.4	22.7	30.1
Muriate of Potash	160	43.8	9.4	3.0	24.6	23.7	160.8	22.3	30.5
Superphosphate	320	43.6	9.0	3.1	24.2	24.7	156.8	22.4	29.7
Complete Fertilizer	213	48.7	9.4	3.2	25.4	25.0	166.3	24.1	29.6
Potato Fertilizer	320	......	......	......	......	......	167.5	......	......
Royal Canadian	320	......	......	......	......	......	164.5	......	......
Cow Manure	40,000 (20 T.)	......	......	......	......	26.9	174.7	26.3	29.0

For these co-operative experiments the fertilizers and seeds were sent to the experimenters from the College each year. The nitrate of soda and muriate of potash were applied at the rate of 160 pounds per acre and the superphosphate at the rate of 320 pounds per acre. The complete fertilizer was a mixture which was composed of one-third of the amount of each of these fertilizers and was, therefore, applied at the rate of 213⅓ pounds per acre. In early spring, as soon as the land was dry enough, the fertilizers were powdered by breaking any lumps that had formed and were applied to their respective plots. The advice given to the experimenters was to apply 500 pounds of average cow manure to one

plot in each test, the application being equal to 20 tons per acre. The cow manure and the fertilizers were used as a top dressing.

Each experimenter was asked to conduct his fertilizer test on the average soil of his farm. On some farms the fertilizers paid much better than they did on others. In using commercial fertilizers the farmer is wise who obtains as much information as possible regarding the requirements of his own particular farm. The results in the preceding table should furnish valuable suggestions on the use of fertilizers and manures.

The price of fertilizers vary considerably from time to time and it is suggested that each person interested in this subject should secure the monthly bulletin issued by the Seed Branch, Department of Agriculture, Ottawa, which deals with the Seed, Feed and Fertilizer Markets for Eastern Canada.

High and Low Grade Fertilizers with Oats

A co-operative experiment in growing oats using a high grade and a low grade fertilizer with barnyard manure and with no manure or fertilizer was started in 1920 and has now been conducted for the last six years. The high grade fertilizer was what is known as a 3-8-3 and the low grade a 1-8-1, and each of these were applied at the rate of 200 pounds per acre. The barnyard manure was applied at the rate of ten tons per acre. The fertilizers were mixed in the soil to a depth of from one to two inches and the barnyard mauure to a depth of from four to five inches. Clover was sown with oats in each instance. We hope later to obtain results showing the influence of the fertilizers and manure on the oats in the first year and on the clover in the second year after the applications were made. The results in the following table show the average yield of oats per acre for 1926 and for seventeen tests conducted in the past six years:—

	Grain per acre (bus.)	
	1926	Average (6 years) (17 tests)
Barnyard Manure	49.41	49.15
High-grade Fertilizer	47.06	48.51
Low-grade Fertilizer	44.71	44.33
Nothing	40.00	40.11

Barnyard manure gave the highest returns in four out of the six years and the high grade fertilizer gave the highest returns in the other two years. The unfertilized land gave the lowest yields in each of the six years. The average results show that land which received ten tons of barnyard manure per acre produced a little over nine bushels per acre more than the land which was unfertilized. In these tests the experimenter was advised to select land which was uniform throughout and which was about the average type of soil on the farm.

Testing Fertilizers and Manure in a Definite Rotation, Starting with Potatoes followed by Barley to be Seeded with Alfalfa

This co-operative experiment was conducted for the first time in 1926. A complete fertilizer was applied at the rate of 320, 640 and 960 pounds per acre; complete fertilizer, 320 pounds and cow manure ten tons per acre; and cow

manure at the rate of twenty tons per acre. In addition one plot was left unfertilized. In the average of three successfully conducted experiments the yields were as follows:—Complete fertilizer, 320 pounds and cow manure ten tons per acre, 249.3 bushels; cow manure twenty tons per acre, 228.0 bushels; complete fertilizer, 960 pounds per acre, 224.0 bushels; complete fertilizer 640 pounds per acre, 186.7 bushels; complete fertilizer 320 pounds per acre, 172.0 bushels; and no fertilizer, 136.0 bushels of potatoes per acre.

A MEMBER.—I think that Professor Squirrell mentioned in his report that there were certain varieties of oats and barley that gave better results when used for mixed grains than others. Would you tell us again the names of these varieties?

PROF. SQUIRRELL.—The varieties of grain grown in a mixture for grain production which have given the largest yields per acre both in the experiments at the College and in the co-operative experiments over Ontario are the O.A.C. No. 21 barley sown at the rate of one bushel per acre along with one bushel of O.A.C. No. 3 oats per acre.

MR. J. W. WIDDIFIELD.—Would a mixture of O.A.C. No. 144 oats along with O.A.C. No. 21 barley give better results in grain mixtures than the O.A.C. No. 3 oat and O.A.C. No. 21 barley?

PROF. SQUIRRELL.—The O.A.C. No. 144 oat matures too late for the O.A.C. No. 21 barley. In a mixture such as this barley is the grain in the mixture having the most influence on yield per acre. Some years ago we tested a mixture of Siberian oats and Mandscheuri barley for grain production. This was a late maturing grain mixture whose yield was between 200 and 300 pounds less per acre than a combination of O.A.C. No. 21 barley and O.A.C. No. 3 oats.

MR. T. G. RAYNOR.—Some soils are so rich that nearly all varieties of oats will lodge. Are there any mixed grain crops that could be used to advantage under these circumstances?

PROF. SQUIRRELL.—The best varieties of barley and oats will lodge less when sown alone than when grown in mixtures. Barley alone would be a more suitable grain to grow under these circumstances than oats or a mixture of oats and barley.

A MEMBER.—Would different quantities of seed sown per acre have any influence on the tendency to lodge?

PROF. SQUIRRELL.—Banner, O.A.C. No. 72 and O.A.C. No. 144 oats sown at the rate of about two bushels of seed per acre on the average soil are less apt to lodge than if sown at a lesser or greater rate per acre. Heavier rates of seeding than the average quantity will produce shorter and finer straw. We have not found in our experiments a greater strength of straw under these conditions. Sowing less than the optimum per acre invariably results in more lodging of grain.

A MEMBER.—Would there be any advantage in sowing a little flax with other grains?

PROF. SQUIRRELL.—Flax will improve the quality of the grain mixture, but it lessens the total yield per acre as compared with a combination of O.A.C. No. 21 barley and O.A.C. No. 3 oats. A grain mixture containing as much as one peck of flax per acre along with oats and barley will not lodge quite so readily as a mixture without the flax.

A MEMBER.—Have you any comparative data regarding the hay yield of alfalfa of the first year as compared with succeeding years?

PROF. SQUIRRELL.—Alfalfa usually gives its maximum production in its third and fourth year's growth. Cut for hay the year after seeding the total hay yield is sometimes 15 to 20 per cent. less than in the third or fourth year.

A MEMBER.—What is the comparative hay yields of the different cuttings of alfalfa?

PROF. SQUIRRELL.—The first cuttings for hay usually gives as large a total yield as the combined yields of the second and third cuttings.

A MEMBER.—Does alfalfa produce better seed during the first years or after it has been down a number of years?

PROF. SQUIRRELL.—Where alfalfa has been sown on suitable land after a good seed-bed preparation the quality of seed does not seem to vary from year to year. Variation in quality is due more to seasonal conditions than to the age of plants from which alfalfa seed is grown.

MR. CARROLL.—Our observations in Peel have been that there is a greater danger of weeds getting in during the early years than in later ones. As far as quality of seed is concerned I do not think you get any better quality from the cuttings of the earlier years. There is a possibility that as the plants get older and naturally thinner there might be a heavier percentage of brown seeds produced.

A MEMBER.—Is the Joanette oat grown in Ontario any more?

PROF. SQUIRRELL.—The Joanette oat is little grown in the Province of Ontario at the present time. This variety, a black oat, is short strawed and well suited for growing on rather rich land. It is a fair yielder and one of the thinnest hulled and best quality oats that we have tested at Guelph.

A MEMBER.—Is there any demand for O.A.C. No. 181 field peas?

PROF. SQUIRRELL.—Yes, a very considerable demand. We had an inquiry last week from a seed merchant in Eastern Ontario who wanted to get two carloads of this variety. The demand for this variety in the last three years has been so great that we were unable to refer inquirers to sufficient growers to supply the demand.

A MEMBER.—How about the quality of sweet clover silage?

PROF. SQUIRRELL.—Sweet clover makes very good silage provided it is cut in the late bud stage, cut finely when put through the cutting box and tramped well in the silo. Sweet clover requires more careful handling to produce the best silage than does Indian corn.

A MEMBER.—Is Sudan Grass grown to any extent in Ontario?

PROF. SQUIRRELL.—No, not yet. This is a variety of sorghum and one of the finest stemmed of this class of crop. It stands dry weather better than other sorghum crops. Its chief use in Ontario seems to be for annual hay production. On warm soils in southwestern Ontario it can be sown for annual hay as late as May 15th and harvested for this purpose before there is danger of injury from frost.

A MEMBER.—Can the secretary tell us on what type of soil smut is most prevalent?

PROF. SQUIRRELL.—If other conditions are favourable for the development of smut the type of soil has little to do with it. We usually find at Guelph that we get the worst smut infection when the weather is warm and humid.

A MEMBER.—Is beardless barley profitable to grow?

PROF. SQUIRRELL.—The best known variety of beardless barley in Ontario is the Success. This variety produces about half the yield per acre of the O.A.C. No. 21, is rather weak in the straw but quite early in maturing. This

sub-class of barley is not to be compared in yield per acre with the best varieties of bearded barley such as O.A.C. No. 21.

ADVANTAGES OF CO-OPERATIVE EXPERIMENTAL WORK IN FIELD HUSBANDRY

(Opinions expressed by the co-operative experimenters themselves.)

1. It leads to a substantial increase in farm profits.

2. It works successfully in nearly every branch of farming.

3. It penetrates into those parts of the country where agricultural advancement is ordinarily very slow.

4. It systematizes seed distribution along definite lines and for valuable purposes.

5. It distributes the very best seeds, plants, fertilizers, etc., among the best men and then assists and encourages those same men to experiment and to investigate.

6. It furnishes hundreds and even thousands of object lessons annually which form centres for interesting study along the lines of progressive agriculture.

7. It helps the farmers to help themselves.

8. It educates along the lines of careful handling, close observation, accurate calculation and economical methods.

9. It trains men to unite science with practice and to lead other men to do likewise.

10. It helps farmers to understand better the scientific principles that they read about in bulletins, reports and newspaper articles and that they hear about at agricultural meetings.

11. It supplies a direct as well as an indirect source of information for the farmers.

12. It enables practical men to obtain information regarding varieties of field and garden crops, selections of seed, dates of seeding, methods of cultivation, ways of increasing soil fertility, etc., for their own particular farms which they could not get in any other way.

13. It enables farmers to get a supply of pure seed of the leading varieties of grains and potatoes, which rapidly increase in quantity, and thus furnishes seed for sowing and planting on large areas and for selling at good prices.

14. It provides a wholesome and an attractive bill of fare for the farmer's table by encouraging the cultivation and use of sweet corn, high quality beans, etc.

15. It supplies valuable topics and results for discussion in the field, at the fireside, in the corner grocery, and at meetings of farmers' clubs.

16. It stimulates the local newspapers to take a deeper interest in advocating better methods of farming.

17. It furnishes some exceedingly important results for printing and distributing in the form of bulletins and reports.

18. It adds dignity to farming and pleasure to farm life.

19. It exerts a wholesome influence in keeping the farm boys interested in farm work.

20. It trains the best men of the country, including the college graduates, to help in the solution of scientific problems which arise in connection with the various departments of agriculture.

21. It furnishes a post-graduate course for young men after returning home from college.

22. It forms a bond of union between the college graduates and their alma mater, as well as among the graduates themselves.

23. It gives the graduates of an agricultural college an excellent opportunity for exerting a good influence in their respective neighbourhoods.

24. It enables both the station and the college officers to know better the real needs of the agriculture of the present day.

25. It makes a practical application of many of the results of the experiment station.

26. It helps to check some of the experiments at the central station by having similar experiments duplicated on hundreds of farms under different conditions of soil and climate.

27. It develops a keen interest in the work of the experiment station.

28. It establishes a sympathetic spirit between the workers at the experiment station and the workers throughout the country.

29. It increases the popularity of the agricultural college, and helps to attract young men to the institution as students.

30. It leads to a steady advance in agricultural education throughout Ontario.

REPORT OF THE CO-OPERATIVE COMMITTEE ON AGRICULTURAL CHEMISTRY

The Need of Phosphate in Ontario Soils

Professor R. Harcourt, O.A.C., Guelph

The department of chemistry is continuing its work in the study of th soils of Ontario. This work consists of a detail soil survey in which the soi: are classified and mapped to a scale of one mile to the inch, which makes i possible to readily locate any definite type of soil. We are following up the su vey with a study of the various types, both by laboratory investigations an field experimental work. It would be impossible at this time to outline all th work we have undertaken. Naturally, we are not as yet in a position to mak positive statements regarding crop adaptation, proper treatment of the soi and the fertilizer requirements of all crops in all the various types of soil, an probably never will be, but, the results obtained make it possible to draw som fairly definite conclusions.

The following is a list of the experiments carried out this year. These a a continuation of similar experiments that we have been conducting for a numb of years.

CROPS EXPERIMENTED WITH

Crop	No. Experiments	No. Plots	Averag
Canning Corn	11	10	1/80 ac
Canning Peas	10	5 to 9	1/2 "
Canning Tomatoes	10	25	1/100 "
Potatoes	6	25	1/100 "
Turnips	5	2	1/4 "
Wheat and Clover	24	4	1/2

In co-operation with Mr. Reek of the Experimental farm at Ridgetown, are also carrying on fertilizer experiments with sugar beets, potatoes and be in Southwestern Ontario.

We have also three demonstration plots, one of twenty acres near Welland in heavy clay soil of the Haldimand series, one of six acres in the light sands of the Dunkirk series, and one on this farm of five acres on the loam of the Guelph series. In addition to these experiments we have carried on some work on different rates of application of fertilizers and a number of experiments with lime and acid phosphate on the acid soils of Muskoka and Parry Sound and some experiments in New Ontario.

The three main fertilizer constitutents were used in most of these experiments, although with the turnip crop, acid phosphate alone was applied. There are very positive indications that in some parts of the province the soils are deficient in lime and that all the various types of soil that we have studied are apparently deficient in available phosphoric acid, for, we have consistently secured profitable returns from the use of phosphatic fertilizers. As the lack of available phosphates appears to be one of the limiting factors in crop production I shall confine my remarks to a discussion of the results obtained from the use of phosphatic fertilizers.

For three years we have carried on experiments with the turnip crop. As this crop is known to have difficulty in securing its supply of phosphoric acid, we simply applied acid phosphate at the rate of 500 lbs. per acre to a portion of the field before the soil was drilled. The ground had been manured and prepared for the crop in the usual way and the object was to see what effect the acid phosphate would have. Last year the aphis played havoc with this crop and we lost our experiments, but the average increased yield from the treated part of the field for the two previous years was 131 bushels. The acid phosphate cost six dollars and even at 10 cents per bushel the increased yield was worth seven dollars and ten cents more than the cost of the fertilizer.

Canning peas have been one of the crops we have grown on our demonstration plot in the Dunkirk sands of Norfolk County. The results we obtained there, led us to carry on co-operative experiments with the growers of the neighbourhood. The experiment consisted of, in some cases, five plots, in others, where the field was uniform and large enough, nine plots. The plots were one-half acre in size so that we could take advantage of the offer of Mr. W. L. Innes of the Canadian Canners, Simcoe, to have the peas graded the same as all peas delivered at the factory. This experiment was carried on for two years with ten experimenters each year. The first year, owing to hot dry weather, the results were not reliable. Last year acid phosphate increased the yield over 20 per cent and improved the quality.

On four farms the ground on which the above experiment with the canning peas was conducted was seeded with fall wheat and harvested in 1926. The wheat grown in the acid phosphate plots yielded 47.9 bushels per acre, while the check plot yielded 28.7 bushels, an increase of 19.2 bushels, over 60 per cent. We will note next year the effect on the third crop since applying the fertilizers.

In the same district we have conducted experiments with potatoes for a number of years and the average increase due to acid phosphate alone was just a little over 35 per cent. Experiments conducted in other districts have given us similar results.

In this same district we have conducted experiments with tomatoes and again the acid phosphate plot gave a much heavier yield than the check plot. In this instance the average increased yield was 25 per cent.

Some years ago we carried out a number of experiments with different kinds of phosphates on a variety of soils with the wheat crop. The results were so uniformly good that we decided to try to demonstrate this fact to the wheat

growers of the province. In the fall of 1922 we arranged, through the Agricultural District Representative, with three farmers in eight different counties to carry out these demonstrations. As the greater part of the soil in the counties selected was acid, we included lime in the demonstration. The details of the plan of the experiment and the results obtained will be found in Ontario Agricultural College Bulletin No. 321. All I want to do here is to point out that the average increased yield of wheat in the plot receiving lime and acid phosphate was 54.6 per cent. These results were so striking that we repeated the work in eight other counties, the soils of which were acid, with the result that we got an average of 45.2 per cent. increase from the lime and phosphate plot. The work was repeated on the soils of a third lot of eight counties. This time on soils that did not require lime, and the average increased yield was 28.1 per cent. As the average yield of the check plots in this last series was over 36 bushels per acre, it is not strange that we did not get as large a percentage increase as in the previous experiments.

The returns in increased yield of clover the next year was just as striking, for the lime phosphate applied with the wheat in the fall of 1922, not only caused an increase of 54.6 per cent. in the yield of wheat, but there was 60.8 per cent. more clover in 1924, 36.0 per cent. more in 1925 and 28.3 more in 1926, showing that the added materials were not all used up with the first crop. Lime applied alone increased the yield of clover 40 per cent. the first year, 27.2 the second and 17.2 the third. These experiments were carried out in a wide range of soils and included several types of soil. Consequently, I think we can assume that there is a lack of sufficient available phosphoric acid in most of the soils of the province.

There are many reasons that might be advanced as to why phosphates have given such good results. The soil does not contain as large quantities of phosphoric acid as it does of potash, in fact the proportion is about one to ten. The nitrogen content will vary with the amount of organic matter and is more under the control of the farmer than the mineral constituents. Farmyard manure contains less than half as much phosphorus as it does either nitrogen or potash. The grain contains more than two-thirds of all the phosphorus taken up by the plant, and when the grain is sold a comparatively large quantity of phosphorus is lost to the farmer. When we take into consideration that the soils contain a comparatively small amount of phosphorus, that it is not readily rendered available, that farmyard manure is low in phosphorus, that when grain is sold large quantities of this essential plant food constituent is carried away from the farm, and that even when the grain is fed in the farm phosphorus is lost to the soil in the building of the bone of the animal and as a constituent of milk.

We are not contending that acid phosphate alone will give the best results, nor that it is the best form of phosphate to apply. What we wish to bring out is that an available form of phosphate does give a decided increase in the yield of a number of crops. It is possible, even probable, that when the land has been well manured for fall wheat acid phosphate may be the most profitable fertilizer to use. With potatoes, our experiments show that even when the soil is well prepared, potash is necessary and that unless there is a good supply of decaying organic matter, nitrogen should be one of the constituents of the fertilizer. The same is true with many other crops, but we are strongly of the opinion that with few exceptions better crops will be produced on the soils of this province, if some good form of phosphate is used to supplement farmyard manure and that in all mixed fertilizers the amount of phosphoric acid should be kept high, even up to 10 to 12 per cent.

A MEMBER.—Will the application of acid phosphate at the rate of 400 pounds per acre consume the lime in the soil and produce an acid condition which will be serious in the growing of alfalfa?

PROF. HARCOURT.—Alfalfa is such a deep rooted plant that even were the surface soil acid it would be able to establish itself. Most of the soils throughout the Milton district where alfalfa is extensively grown, show acid conditions on the surface. Acid phosphate will not produce an acid condition of the soil. It has no acid reaction in itself.

A MEMBER.—What is the reason that such poor results are being obtained in the growing of red clover?

PROF. HARCOURT.—In many cases lack of acid phosphate. It is often found that where acid phosphate is applied, the stands of clover are better and increased yields as high as 64% have been obtained.

A MEMBER.—Does it make any difference how acid phosphate is applied?

PROF. HARCOURT.—There is a good deal in the method of application and that is something we are now experimenting upon. Experiments have shown that where the fertilizer is in contact with the seed it often hurts the germination. At the same time it requires to be close to the plant when it commences to grow to provide readily available plant food. Many claim that fertilizers should be sown broadcast. Seasonal conditions have a good deal of influence on the method of application. It stands to reason that if you put plant food in one place you will localise the root system of the plants and in a dry season these may not be able to obtain sufficient moisture.

A MEMBER.—Would you recommend the fertilizer drill?

PROF. HARCOURT.—Yes.

A MEMBER.—In the fertilizer experiment with turnips, how was the acid phosphate applied?

PROF. HARCOURT.—It was applied broadcast to the turnip crop.

A MEMBER.—In soil containing plenty of limestone would you use lime with the acid phosphate?

PROF. HARCOURT.—No, not usually but in some counties like Grey and other counties in the north, the soil needs lime.

A MEMBER.—In good farming practice, how often should acid phosphate be applied?

PROF. HARCOURT.—That would depend upon the rotation practice. In rotations where wheat is grown it should be applied every four years. I do not think that you could expect to get results from an application of acid phosphate for more than four years. It should be applied previous to the sowing of the "money crop."

A MEMBER.—Is the phosphate in commercial fertilizers, acid phosphate?

PROF. HARCOURT.—Yes. The regulations require that it shall practically all be available phosphoric acid.

A MEMBER.—What makes a shortage in straw?

PROF. HARCOURT.—Usually a shortage of nitrogen in the soil. Phosphoric acid has something to do with the question of yield and the filling out of grain. About four-fifths of the phosphate taken by the plant is found in the seed.

REPORT OF THE AGRICULTURAL PHYSICS COMMITTEE ON THE SUBJECT OF RURAL SANITATION

PROFESSOR R. R. GRAHAM, O.A.C., GUELPH

Rural sanitation, in this instance, includes the subjects of water supply, water systems, plumbing and sewage disposal as related to the country home. For various reasons this is a subject that the rural people in the past have not bothered themselves about very much, they being able by the very nature of their life and character of their work, to live well and make very good progress without all the home conveniences that their city friends enjoy so much and consider absolute necessities. No one but a high pressure salesman of sanitary equipment would claim for a moment that an up-to-date bathroom was an absolute necessity in a country home, but all of us I think will agree that it would be a great convenience and comfort for the family, and that they are just as much entitled to it as the city people, and if they can afford it, they should have it. It is a certainty that those farmers who have modern conveniences, would not want to be deprived of them for a good deal. That not a few farmers are getting interested in running water and bathrooms for their homes is amply manifested by an ever-increasing demand for advice and information on the various topics I mentioned at the outset. In order "to make good" with these seekers after the truth about these things, we are carrying on investigation of sanitation as it applies to farm home conditions and requirements, and also of the equipment, and its installation best suited to those particular conditions. In the short time at my disposal this afternoon, I can review only our work for the last year or so on systems of sewage disposal for rural districts, and merely make mention of other problems under study.

SYSTEMS OF SEWAGE DISPOSAL FOR RURAL DISTRICTS

The system which we have been recommending for some time is the two-chamber tank with an automatic siphon. There was such a demand for information and plans for this system that we decided last year to send a questionnaire to all who had written us for assistance, in order to find out just how many had installed the system, and if so, with what success. Herewith is attached a copy of the questionnaire and the letter that accompanied it, that was sent to each person on our enquiry list.

Dear Sir or Madam:—

Your name is one on our long list of enquirers about septic tank system of sewage disposal, and one who received from this office information concerning the same in form of bulletin and maybe blue-print. Our interest in you and your improvements to your home does not drop out of sight or remembrance once your questions are answered, and literature has been forwarded to you. We are always anxious to know if we have helped you any or not, and furthermore we want to know if the information and instructions sent out are clear, full enough, and put in the best possible form to be most serviceable. With these objects in view we are submitting to you on a separate sheet enclosed just a few simple questions which we trust you will kindly answer and mail back to us in the enclosed stamped envelope. We want you to be frank and tell us exactly where and how we have failed to serve you to the greatest possible degree. If the systems we recommend are not actually working out well in the farm places, we want to know it and why, so that we will know where to get busy and strengthen the weak points. We trust you see our reason for writing you and that you will be sufficiently interested to give us your viewpoint and experience through answers to questions.

THE COMPRESSION WATER SYSTEM

Incidentally we would like to remind you that we have several makes of this kind of water system in our Department on exhibit and test and we think there is nothing better for a country,

village or suburban home where there is no municipal water supply system. It can be operated by hand, gasoline engine, electric motor or windmill. If you are interested indicate under Remarks on Question and Answer sheet.

Yours very sincerely,
R. R. GRAHAM.

Dept. of Physics,
O.A.C., Guelph, Ont.

1. Did you get from us the information you wanted?.......................................
   Was the information satisfactory in every respect?.......................................
   Any suggestions to offer?.......................................
2. Have you put in the system yet, and if so, when?.......................................
3. Did you do the work yourself, that is to say without a hired mechanic of any kind?........
   If any assistance, by whom?.......................................
4. Any difficulty experienced in getting material and fittings?.......................................
5. Did you find the instructions and plans supplied satisfactory?.......................................
   Any criticisms to offer *re* the plans?.......................................
6. About what did the system cost you?.......................................
   Are you satisfied with cost of it?.......................................
7. Is system working well?.......................................
   What care and attention do you give system each year?.......................................
8. Remarks and suggestions.......................................
9. Name and address.......................................

About 500 people were written and we got replies from 275, a very fair result. The number of 140 testified that they had installed the septic tank, about 60 put it in themselves without any outside help, very few had any difficulty in securing the necessary materials and fittings, the majority found the plans and instructions sent them to be satisfactory, the cost of the system, excluding labour, was on the average about $50.00 and of those who had the system working for a while, the majority seemed well pleased.

On the strength of this evidence in favour of the septic tank recommended, supplemented by our own personal observation of a great many installations, we published Circular 46—"The Septic Tank," which is well illustrated with drawings for the guidance of those constructing the system. In many cases blueprints are supplied as well.

THE THREE-CHAMBER TANK

The most common trouble that develops in the two-chamber septic tank in time is the clogging of the tile system, particularly in fine-grained, slow drainage soils like heavy clay. The material that fills up the tiles consists of finely-divided undigested sewage and some sludge that escape from the tanks in the effluent. In time, this accumulation will clog the tile in any soil, even a sandy or gravelly one, so the logical way of avoiding the trouble would seem to be to prevent, or do away with the fine solids in the tank. This has suggested the use of three chambers instead of two in order to effect a more complete digestion and elimination of the solids within the tank. We have several of these systems under observation, and time will tell whether or not this system will clog the tile or not.

If soapy and greasy water be excluded from the septic tank, and the tank be not overloaded by too much sewage and too much water, the bacterial action in the chambers will be more thorough and complete, and the tile will not clog up so soon. An occasional cleaning out of the tank will also doubtless help to postpone the trouble.

The three-chamber system may be built with or without the siphon, but it (the siphon) should not be as necessary in this system as in the two-chamber type.

The Problem of Freezing

Although the majority of people at first have apprehensions as to the freezing of the system in our severe winters, it is a very rare thing to receive any complaints of freezing from users. In the questionnaire referred to, only two reported any trouble, one saying that the inlet pipe between house and receiving chamber froze up during a very cold snap, but that he soon got it thawed out and no harm was done. In this case the tank was built a good deal above the ground level and hadn't been protected very much by a covering of earth. The other reported that the absorption bed froze but gave no particulars, and although we wrote him about it, no further word was received from him.

The following letter from a party in the Muskoka Lakes District makes interesting reading in regard to this problem of freezing as well as testifying to the success of the septic tank as a system of sewage disposal under adverse soil conditions.

Interesting Report on Experience of Use of Septic Tanks in Muskoka District

"I have just received the annual report of the Agricultural and Experimental Union. On page 35 there is an article on sewage disposal in which you mention that you are endeavouring to obtain data in reference to use of septic tanks in winter. I may be able to be of some assistance to you in this matter as I have had considerable experience in installing septic tanks, having built the first on the Muskoka Lakes and later put in over 100 under all possible conditions, on rocky islands where it was difficult to find sufficient tiling ground among the rocks, and in solid hard pans where trenches for tile had to be filled with gravel and from the smallest tank suitable for a small family to hotels accommodating 200 guests, and several of these including my own for use during the winter. I have not had any trouble with these. In my own case the tank has been opened only three times in over ten years, and the tile relaid once two years ago. The test in my case has beer particularly severe as for the last two winters my house has been unoccupied during the winter but each spring the plumbing has been connected up and the tank has resumed its functions without any trouble whatever. Our winter climate, as you probably know, is exceptionally severe, but in no case have I ever heard of any trouble. The tank should if possible be under ground, or if that is difficult, should be mounded up with earth and have a cement top covered with earth. The water going into the tank is always more or less warm and the chemical action of the sewage has also some influence I think."

After forwarding him some of our results on problems of freezing, he wrote in part as follows:—

"Your letter giving temperatures at various points in the sewage system interested me very much as I never had the means or opportunity of obtaining such information, but I knew that the system worked perfectly during the winter. I think we have rather the advantage of you in this respect, for although the temperature is probably very much lower than at Guelph, sometimes falling to thirty-five degrees and even forty degrees below zero, the early snowfall is a protection and the ground here seldom freezes more than a few inches, and in many winters does not freeze at all, and we can usually depend on digging through the snow and finding unfrozen soil at any time during the winter if we need it. We never give any protection to our hardy perennial plants, and hardly ever have any damaged. I am afraid there will be difficulties to overcome in the north-west where I understand the ground freezes several feet deep. The tile might be protected in some way by covering with straw or some such material. This will be a matter for experiment, and I shall be interested in the result."

WINTER TEMPERATURES IN THE SEPTIC TANK SYSTEM, AT O.A.C., GUELPH, ONT.

The following table constitutes a summary of the results of this study to date. The temperatures were recorded by self-recording thermometers. The septic tank was a two-chamber system located close to the south east side of the Physics Building. There was no special protection or covering over the tank. The vent on the tank and one on the sewer line between the tank and the absorption bed were both left open as in summer time. The tile in depth varied from 16 to 22 inches in a clay loam soil, covered with turf over which there were a few inches of snow most of the time.

SUMMARY OF TEMPERATURES

Months	Air Temp.		Temp. in Tile		Temp. in 1st Chamber		Temp. in 2nd Chamber	
	Lowest	Average	Lowest	Average	Lowest	Average	Lowest	Average
December........	-4	22	34	39.4	46	52.9	35	44.3
January..........	-5	16.8	35	39.3	44	52.6	34	42.3
February.........	-6	21.1	37	40.8	48	52.8	42	46.3

Conclusions:—

1. The temperature in the first chamber or sewage chamber remains very constant, being affected very little by the changes in the outside or air temperatures. This fact would have been still more marked if the tank had been covered better.

2. The temperature of the second chamber was not so constant and was considerably lower, 8 or 10 degrees lower, due to closer proximity of the vent pipe, had considerably less sewage and bacterial action, and a smaller volume of liquid and material.

3. The vent pipe should be covered with some porous material like burlap or straw to prevent very cold draughts of air entering the tank, and the tank, especially the second chamber, should be covered with about one foot of soil or some substance like strawy manure or even a good depth of snow. With this precaution with the tank, the tile should not freeze without extra covering, as the effluent entering them would be much higher than shown in the table, except in very cold districts with very light snowfall. In such cases the tile ought to be covered with six or eight inches of straw, wild hay or strawy manure.

SNOW AND STRAW AS PROTECTORS AGAINST FREEZING

At East Lansing, Michigan, it was discovered that soil covered with five inches of snow was five to six degrees warmer than the same soil bare of snow. The snow is still more effective if the soil has considerable vegetation on its surface. At the same Experiment Station it was found out that uncovered soil froze to a depth of seven inches on December 11th, while that covered with straw froze on February 14th, and on certain cold nights the ground covered with straw remained as much as 10°F. warmer than the unprotected ground.

In cases where the frosts are liable to get into the tank or tile, a covering of straw or strawy manure or a good layer of snow would give good protection.

OTHER SUBJECTS UNDER STUDY

Among these are the best method of ventilating septic tanks, plumbing the farm home, the best form of cribbing for shallow wells, simple method for filter-

ing rain water to make it fit for drinking purposes, the use of the windmill for pumping water both into a compression tank to supply the house, and an open tank for the stable supply of water, both systems being under automatic control.

A MEMBER.—I am sure we have all been very interested in what Professor Graham has told us and I can say from personal experience that a properly constructed septic tank is most satisfactory. We constructed a septic tank some twelve years ago, four feet deep by three feet high and three feet wide. We did not use an automatic valve, they were more expensive then than to-day and we connected up with the field tile system. We used no vent pipe but covered the tank with a foot of clay and it has never been opened since. All it cost was one and one-half yards of gravel, the cement and a little time—in all about $10.00.

PRESIDENT.—I think what we need is some lively propaganda spread through the farming communities which would advocate the adoption of proper sewage disposals and proper systems of supplying fresh water to the home. While there has been considerable improvement in conditions during the past few years, this improvement is not as rapid as we would like to see. There is no reason why the living conditions on the farm should not be fully up to the standards of living conditions in the city.

A MEMBER.—Is it absolutely necessary to have two tanks in the system? In our case, we had an old well to which we piped the effluent after treatment in a single tank. On opening the old well recently, we found that the bacterial action had completely destroyed all traces of the sewage.

PROF. GRAHAM.—That question cannot be answered definitely unless soil conditions and the situation of the water supply as well as the situation of the old well is taken into consideration. Otherwise you might easily get into trouble with a polluted water supply.

THE HIGHWAY TO BETTER CROPS

PROF. A. C. ARNY, AGRICULTURAL COLLEGE, UNIVERSITY OF MINNESOTA

The goal that the majority of growers of crops have in mind is making a fair income that will permit them to enjoy many of the advantages and comforts of life.

One of the important factors in making a fair profit on farms is the yield per acre produced. The following table brings out this point clearly.

TABLE I—COST OF PRODUCING OATS—MINNESOTA, 1925

	Amount	Price	Total Cost
Man labour	13¼ hours	25 cents	$3 31
Horse labour	26½ hours	12 cents	3 18
Seed	2¾ bus.	40 cents	1 10
Twine	2¾ lbs.	13 cents	36
Threshing	42 bus.	3 cents	1.26
Machinery			1 00
General			51
Operating cost			$10 72
Land rent			5 00
Total cost per acre			$15 72
Yield 42 bushels per acre		31 cents	13 02
Net loss per acre			$2 70

The cost of producing oats varies somewhat with location, labour cost, and land rent. Adjustments can be made in the different items to make the total cost and income fit local conditions. An increase in the yield per acre to 60 bushels would increase the twine cost around 3 cents and the threshing cost 54 cents per acre making the cost of production per acre $16.29. At the same time, the income would be increased to $18.60 which leaves a profit of $2.31 per acre.

Ways of Increasing Yield Per Acre

A few of the ways of increasing the yield per acre, quantity and quality considered, and at the same time maintaining the producing power of the soil at a high level over a period of years are the following:

Grow the Most Profitable Crops. Alfalfa where it does well or can be made to do well without too great expense produces higher yields of more valuable forage than red clover. Sweet clover, where it can be grown to advantage, yields more pasture and hay of a higher feeding value than the ordinary pasture grasses. For the past few years in Minnesota barley has been a more profitable crop than oats.

The Best Varieties or Combination of Varieties. In some instances it is necessary to use the right variety in order to grow the crop successfully over a period of years. Grimm alfalfa is necessary for successful alfalfa culture in Minnesota and other states of like conditions. Hairy Peruvian gives better results than any other varieties of alfalfa in southern California.

Usually there is a choice of several varieties and choosing the right one may mean an increase of 20 to 30% in the yield per acre. Marquis wheat, a variety originated in your country, has given a large increase in yield in Minnesota over the other varieties of spring wheat available at the time of its introduction.

The Ontario Agricultural College issues a list of varieties recommended for the province. It is to the financial interest of every farmer in the province to secure seed of the variety on this recommended list that will do best on his farm.

Considerable further development of high yielding varieties is to be expected in the near future. College and experiment station men are better trained for their work, they know the breeding stocks better and have better equipment available for their work than in the past. At present, the needs are considered and then through co-operation of plant breeders, agronomists, plant pathologists, and soils men varieties are originated, tested and put out to meet particular needs.

A concrete illustration of this method of work is the smooth awned barley varieties now available. They yield as high or higher than the best rough awned varieties and have the very considerable advantage of being no more unpleasant to shock than bearded wheat. Farmers may as well have as much comfort as possible while on the highway to better crops. This is only one illustration of the many that may be looked forward to within the next few years.

High Quality Seed Treated for Diseases. The value of high quality seed has been emphasized in the past and still farmers do not give it due attention. Satisfactory seed grain is high in germinating power, free from the seeds of weeds, and treated for disease. The copper carbonate treatment for stinking smut has made it much easier and more satisfactory to take care of this disease than by the formaldehyde treatment.

Efficient Cropping Systems. The needs of each individual farm must be considered in deciding on a suitable cropping system. There are certain principles, however, that must be considered in planning any good rotation if it is to bring the best possible results.

A legume crop such as clover or alfalfa about once each third to fifth year in the rotation adds organic matter and aids in maintaining the nitrogen content of the soil particularly when the legume crop is fed and the manure returned to the land. In table No. 2 are given the average yields of hay secured from various hay crops in per cent. based on the yields of red clover as 100 and the yields of four grain crops following the growing of these hay crops for two years previous.

TABLE II—COMPARATIVE YIELDS OF HAY CROPS AND THE EFFECTS OF THESE HAY CROPS ON THE GRAIN CROPS WHICH FOLLOW

Hay Crop Preceding the Grains	Yields Hay	Average Yields per Acre				Average Yield Four Crops
		Wheat	Oats	Barley	Flax	
	Per Cent.					Per Cent.
Medium red clover.....	100	29.1	66.5	45.4	13.9	100.0
Alfalfa................	117.6	31.3	64.2	44.9	12.1	97.5
Sweet clover...........	106.5	26.2	67.6	46.4	11.1	93.5
Medium red and timothy	99.0	23.7	53.3	40.7	13.9	89.1
Alfalfa and timothy.....	110.1	24.9	57.3	45.7	12.8	91.1
Timothy.............	55.3	17.3	41.4	29.2	8.4	61.6

The relative effect of a legume or a mixed legume and grass as compared with a non-legume timothy, is very striking. The temporary depressing effect of timothy on the crop immediately following has been explained as due to the utilization of the nitrates in the soil by bacteria living on and using the carbohydrates in the timothy roots as a source of energy. The nitrogen utilized in building up the bodies of the bacteria is temporarily unavailable to plants but becomes available when the bodies of the bacteria decay.

Corn or other cultivated crops in the rotation aid in keeping the fields free from weeds and the land in good physical condition. In table No. 3 is shown the results of continuous and rotation cropping with the same amounts of manure applied in each system over a period of ten years starting with a soil in a good state of productivity.

TABLE III—RELATION OF CROPPING SYSTEMS TO YIELDS OF WHEAT, OATS AND CORN ON FIELD T. 1908–1918, INCLUSIVE. UNIVERSITY FARM

Crop	Ten-year Average Yields		Increases due to rotation	
	Continuous cropping with manure	Rotation cropping with manure	Per acre expressed in	Per acre expressed in
	bushels	bushels	bushels	Per cent.
Wheat.............................	19.95	27.77	7.82	39.20
Oats..............................	55.27	68.30	13.03	23.57
Corn..............................	40.12	51.45	11.33	28.24

ROTATION CROPPING PRODUCES AS MANY BUSHELS ON LESS ACRES

		bushels
Wheat	5 acres continuous cropping yielded	99.75
	3.6 acres rotation cropping yielded	100.00
Oats	5 acres continuous cropping yielded	276.35
	4 acres rotation cropping yielded	273.20
Corn	5 acres continuous cropping yielded	200.60
	4 acres rotation cropping yielded	205.80

Wheat in rotation yielded 39.20%, oats 23.57%, and corn 28.24% higher than the same crops grown continuously. These increases are due to the effect of the leguminous and cultivated crops in the rotation. The average yield of corn grown continuously with two tons of manure per acre per year was relatively lower than the wheat or oats grown the same way. This brings out the point that a cultivated crop grown continuously is harder on the land than either of the grain crops grown continuously.

The last part of the table brings out the point that as many bushels can be grown on less acres when good rotations are followed as compared with growing the same crops continuously with manure.

While the main benefit from the use of good rotations comes from increased yields per acre, there may also be an improvement in quality of the product. The protein content of a crop is dependent on the supply of nitrates in the soil. With an ample supply of nitrogen in the soil, and moisture and temperature conditions favourable, the protein content of the crop will usually be higher than where the nitrogen content of the soil is relatively low. Over a three-year period oats grown continuously with manure contained 12.64% protein while oats grown in the rotation, oats, clover, corn with manure applied at the same rate contained 14.33% protein.

Planting Crops at the Right Time results in marked increases in yield as compared with planting at 10, 20 and 30 days later. Planting wheat 10 days late, resulted in a reduction of 25% in yield. Oats planted 10 days late yielded 7% lower and barley 12 days late, 26% lower than when planted at the usual time.

Time of Cutting Crops is of great importance in order that growers may secure the best product for the purpose for which it is to be used.

The materials which are built into the plants come from two sources: (1) small amounts from the soil and (2) relatively large amounts from the air.

From the time plants get to the stage of development when they start to make rapid growth until they reach full bloom, they take from the soil nitrates, phosphoric acid and potash at a more rapid rate relatively than they are able to build up dry matter.

TABLE IV.—Per cent. of total dry matter, nitrogen, potash and phosphates taken up by wheat plants at different stages of development.

Stage of Maturity	Dry Matter	Nitrogen	Potash	Phosphoric Acid
	%	%	%	%
18 inches	45.8	85.9	74.7	79.6
Headed	58.8	88.6	88.5	83.3
In milk	95.5	95.4	100.0	97.8
Ripe	100.0	100.0	93.6	100.0

Examination of the data in Table Number 4 shows that at heading time of the total needed the plant had taken up 88.6 per cent. of the nitrogen, 88.5 per cent. of the potash and 83.3 per cent. of the phosphoric acid and during the same time had built up only 88.5 per cent. of the total dry matter.

This excess nitrogen and phosphoric acid is stored temporarily in the leaves and stems until the grain begins to form and fill. In crops where the seed forms a considerable part of the total weight at maturity, 50% of the nitrogen in the leaves and 40% in the stems at full bloom is moved to the grain. Phosphoric acid is moved from the leaves and stems to the seed in much the same way as nitrogen so that during seed formation little phosphoric acid needs to be absorbed from the soil. In table No. 5, it will be noted that at maturity the spikes form about 2/5 of the total weight of the crop for wheat and only about 1/6 of the total weight for timothy. The change in amount of protein in leaves and stems and the seed is shown very strikingly in columns four and five of table No. 5. As the plants pass from the full bloom to the mature stages there is a decrease in the protein in the leaves and stems and an increase in the spikes.

TABLE V.—DRY MATTER AND PROTEIN IN POUNDS PER ACRE IN THE SPIKES, STEMS AND LEAVES OF TIMOTHY AND WHEAT AT DIFFERENT STAGES OF DEVELOPMENT

Stage of Development	Dry Matter per Acre			Protein per Acre		
	Spikes	Leaves and Stems	Total	Spikes	Leaves and Stems	Total
Timothy						
Beginning heading	....	2093.9	3093.9	....	167.9	167.9
In bloom	316.3	2971.2	3007.5	38.1	158.1	196.2
Just out of bloom	381.1	3592.7	3973.8	43.5	169.7	213.2
Seeds in dough	607.6	3901.2	4508.8	68.9	162.9	231.5
Seeds ripe	715.9	3399.0	4114.9	84.3	129.6	213.9
Wheat						
In bloom	451.1	2971.2	3422.3	50.4	232.6	283.0
Seeds in milk	1140.7	3600.4	4741.1	108.9	188.1	297.0
Seeds in dough	1928.2	3599.0	5527.2	194.0	174.9	368.0
Seeds ripe	2226.1	3012.2	5238.3	246.6	97.3	343.9

When plants such as wheat are used for forage, little control of the quality can be exercised by cutting at different stages of maturity for the reason that in order to secure a good yield the plants must become practically mature. Cutting at immature stages reduces total yields materially.

On the other hand with plants such as timothy or alfalfa or any other forage crop, where the seed forms a relatively small part of the total yield, the crop may be cut at full bloom or earlier without great loss in yield. With this class of crops then, control of quality of crop by cutting at the stage that will give hay of the desired composition is possible.

The control that can be exercised on quantity and quality of alfalfa hay through time of cutting is shown in table No. 6, taken from Kansas Agricultural Experimental Station, Technical Bulletin Fifteen. The yields are averages for a period of 8 years. Cutting in the bud stage resulted in an average yield of

2.65 tons per acre with an average protein content of 18.4%. Cutting at tenth and full bloom resulted in increased yields with a lower protein content.

TABLE VI.—YIELD, PROTEIN CONTENT AND FEEDING VALUE OF ALFALFA CUT FOR HAY AT DIFFERENT STAGES OF DEVELOPMENT

Stage of Cutting	Protein Content	Average Yield Hay per Acre	Beef Produced per Acre
	%	Tons	lbs.
Bud Stage	18.4	2.65	322
Tenth Bloom	17.9	3.21	308
Full Bloom	16.2	3.43	317
Seed Stage	14.1	2.91	147

Feeding tests showed as high beef production per acre from the lower yields of high protein content hay as from the larger yields of lower protein content hay.

The President.—I want to compliment Professor Arny on his address. He has given us a large amount of valuable information to carry home with us and to put into practice.

A Member.—I was glad to hear Professor Arny mention sweet clover. We grow corn as a silage crop. Is sweet clover being used to any extent as a silage crop in the United States, and with what success?

Prof. Arny.—It is being used to some extent but has not replaced corn by any means.

A Member.—At the close of Professor Arny's address he emphasized the fact that nitrogen should be in an available form to assist in the development of seed. Just what is considered the best available form?

Prof. Arny.—Any form which is soluble in water. Most of the nitrogen is turned into nitrate before being used by the plant.

A Member.—You would not put on any special fertilizer?

Prof. Arny.—The particular kind of fertilizer used would depend a great deal on the soil requirements.

A Member.—With regard to the percentage composition of the crop, have not some scientists taken the stand that while the condition of soil affects the yield it cannot affect the composition of the crop?

Prof. Arny.—There is plenty of evidence that the composition of the soil not only influences the yield of crop, but actually influences the composition of it, that is, the quality. A notable illustration of this is, that protein content of wheat can be influenced by the fertility available in the soil.

SOME INTERESTING RESULTS IN WINTER HOG FEEDING

Prof. Wade Toole, O.A.C., Guelph.

There has always been considerable difference of opinion regarding the relative economy of gains as made by the different breeds of hogs. A number of years ago an experiment carried on over a five-year period at this institution showed fairly conclusively that there was a good deal more in individuality and in strain than there was in breed because the six breeds used did not rank in

the same order in any two years and the variation was so great that a breed that stood at the foot of the list the first year of the trial moved up to first place in the third year, was third in the fourth year and second in the fifth year. Like experiments carried on at other institutions, have given similar results.

However, the results of some more recent work at the O.A.C., may prove interesting to those who still have an open mind on the subject. During the winter of 1922-23 a test was conducted with five breeds, viz: Poland-China, Duroc-Jersey, Berkshire, Tamworth and Yorkshire breeds. These hogs were put on the feeding test at an average weight of 76.4 lbs. each. Three pigs were used in each pen. In economy of gains the rating was:

1. Duroc Jersey	387.4 lbs. meal per cwt. gain
2. Berkshires	397.8 " " "
3. Tamworths	406.3 " " "
4. Yorkshires	417 " " "
5. Polands	476 " " "

It is interesting to note, however, that two of the Yorkshires, two of the Berkshires and two of the Tamworths graded select, and in actual profits at the market they stood as follows:

1. Yorkshires	$6 67	4. Tamworths	$3 56
2. Berkshires	5 52	5. Polands	05
3. Durocs	4 79		

In connection with this experiment, work was started in an effort to find out whether or not the external conformation of the pig has anything to do with certain internal conformation and whether there was any great variation in the length of small intestines and if so, whether or not this variation has any appreciable effect upon the rate and economy of gains in hogs. There was found to be as much as eighteen feet five inches difference in the length of small intestines between two individuals of similar weight in the test. Working on the knowledge that a great percentage of feed digestion takes place in the small intestine, one might be led to believe that the hog with the longest intestinal tract would most thoroughly digest his feed and so might make cheaper and more economical gains. In this particular experiment, the results were not at all conclusive. The hogs with the longest tracts, in every case, made the most rapid gains, but not always the most economical gains. Accordingly, it was decided to go on with this phase of the work.

The entire experiment was enlarged upon for the following year. The point had been raised by some that expensive housing was not necessary even for winter finishing of hogs. Of course, young pigs require more or less warm quarters, but for late summer and early fall litters that have reached 70 to 90 or 100 lbs. in weight before the very cold weather sets in, possibly cheaper dry shelters and open runs would be satisfactory and would save the considerable outlay necessary in permanent pens. It was, therefore, decided to continue the breed test but to carry the work on in outside runs with cheap shelters for each individual pig, so that individual feed costs and all data could be kept as well as for the groups.

Three pigs of each of six breeds were placed in individual runs, and the experiment has been continued for three years on this basis and is still running. The breeds were Yorkshires, Tamworths, Berkshires, Duroc-Jerseys, Poland-Chinas and Chester Whites. Hogs weighed from 79 lbs. to 111 lbs. each and the test started December 21. All hogs were killed as near the 200 lb. mark as possible and the experiment closed on March 11th.

In economy of gains the rating for 1923-24 was:

1. Chester Whites	324.3 lbs. meal and	669	lbs. milk	per	cwt.	gain
2. Berkshires	352.0 " "	759	"	"	"	
3. Durocs	360.1 " "	816	"	"	"	
4. Tamworths	364.0 " "	830	"	"	"	
5. Poland Chinas	366.2 " "	837	"	"	"	
6. Yorkshires	409.6 " "	954.5	"	"	"	

These hogs were followed through to the slaughter test. On the rail these hogs graded as follows:

	Selects	Thick smooths
Durocs	1	2
Polands	..	3
Chesters	..	3
Berkshires	2	1
Tamworths	1	2
Yorkshires	3	..

And in actual profits the breeds stood as follows:

1. Berkshires	$3 43	4. Tamworths	$0 55
2. Duroc Jerseys	1 93	5. Yorkshires	77 loss
3. Chester Whites	69	6. Polands	2 44 loss

It was also found that the pigs made most economical gains early in the feeding period. This finding is in accord with the results of previous work which has shown that the young and growing hog makes the most economical gains although not always the most rapid.

Seventeen separate measurements were taken of these hogs at intervals of two weeks throughout the experiment. These indicated that there was no correlation between length of intestines and external body measurements. As in the first experiment, there was a considerable difference in length of the small intestines and there was some slight indication of correlation between length of small intestines and average daily gains and also economy of gains but not sufficiently marked to warrant any definite conclusion.

Taking the three bacon breeds together the 9 hogs made $3.07 more profit than did the 9 from the three lard breeds.

One point learned from this first experiment was that too much milk had been fed. When feeding in outside runs or cold pens the percentage of milk or water to meal should be kept down to the minimum. These pigs got 2½ lbs. of milk to a pound of meal for a good part of the feeding period and it proved too much for economical feeding. It requires too much animal heat to bring cold liquid in quantity up to body temperature in cold weather.

In the early winter of 1924-25 the experiment, as carried out in 1923-24, was started again with three hogs of the same six breeds in the individual runs. The experiment started Dec. 16 with hogs weighing from 58 lbs. up to 80 lbs. each. Again all hogs were slaughtered as close to 200 lbs. as possible.

In feed required to produce 100 lbs. gain, the six breeds stood as follows:

1. Chesters	333.81 lbs. meal	500.9	lbs. milk	per	cwt.	gain
2. Polands	351.54 "	522.2	"	"	"	
3. Durocs	358.84 "	538.2	"	"	"	
4. Berkshires	368.01 "	551.76	"	"	"	
5. Yorkshires	387.56 "	583.1	"	"	"	
6. Tamworths	414.26 "	613.5	"	"	"	

When these hogs were killed they showed:

	Selects	Thick Smooths
Durocs	1	2
Chesters	..	3
Polands	..	3
Yorkshires	3	..
Tamworths	1	2
Berkshires	1	2

The breeds then lined up as to profits as follows:

1. Yorkshires	$33 24
2. Durocs	31 01
3. Chesters	31 01
4. Berkshires	30 34
5. Polands	29 22
6. Tamworths	22 21

Measurements were made as in the previous test and while there was a considerable difference in length of small intestines it was impossible to determine any correlation between this length and economy or rate of gain and there did not appear to be any correlation between external measurements and length of intestine. It was, however, rather clearly shown that there was a difference in method of increase in weight. Select hogs made increase in length as weight increased whereas thick smooth hogs appeared to make more increase in spread or thickness rather than in length as weight increased.

The fourth trial and the third of the series outdoors was conducted in the winter of 1925-26, with the same numbers of the same breeds as before.

The hogs used this time ranged in weight from 107 lbs. to 123 lbs. at the start of the test and were slaughtered as close to the 200 lb. mark as possible.

Following is the rating of feed per 100 lbs. gain:

1. Polands	339.5 lbs. grain	526.4 lbs. milk per cwt. gain
2. Berkshires	339.6 " "	523.0 " " " " "
3. Durocs	368 " "	530.6 " " " " "
4. Tamworths	395.3 " "	644.5 " " " " "
5. Chesters	423.4 " "	635.5 " " " " "
6. Yorkshires	421.6 " "	711.2 " " " " "

The killing test showed these hogs to hang up:

	Selects	Thick Smooths
Durocs	..	3
Polands	..	3
Chesters	1	2
Yorkshires	3	..
Tamworths	2	1
Berkshires	1	2

Rating the breeds as to profits per group they stood as follows:

1. Berkshires	$23 89
2. Polands	20 83
3. Durocs	20 14
4. Tamworths	20 04
5. Yorkshires	18 36
6. Chesters	16 70

A more thorough attempt than ever before was made with regard to measurements. It was established that there was a direct relation between strength of constitution as shown by heart girth and economy of gains. Length and circumference of small intestine were both considered and while there was a

considerable variation in both length and circumference in different hogs no definite correlation between length and capacity of the intestine and rate or economy of gains could be established. Again, as in the previous trial, the bacon type hogs maintained a balance of conformation while putting on weight whereas the lard hogs thickened more as they grew heavier and put a larger proportion of their gains on the front end or cheaper part of the carcass.

A close study of all this work will show that there is a great deal more difference between individuals of a breed than between breeds. For instance, in the last year reported one of the Chesters yielded $8.54 profit, the second highest profit of the eighteen hogs whereas another Chester yielded only $3.30 profit or the lowest of the entire lot.

Summarizing, then, we find that the breeds line up as follows in rate of gain for feed consumed.

	1st Year	2nd Year	3rd Year	4th Year
1	Durocs	Chesters	Chesters	Polands
2	Berkshires	Berkshires	Polands	Berkshires
3	Tamworths	Durocs	Durocs	Durocs
4	Yorkshires	Tamworths	Berkshires	Tamworths
5	Polands	Polands	Yorkshires	Chesters
6		Yorkshires	Tamworths	Yorkshires

But in actual profits when sold on the market they stood as follows:

	1st Year	2nd Year	3rd Year	4th Year
1	Yorkshires	Berkshires	Yorkshires	Berkshires
2	Berkshires	Durocs	Durocs	Polands
3	Durocs	Chesters	Chesters	Durocs
4	Tamworths	Tamworths	Berkshires	Tamworths
5	Polands	Yorkshires	Polands	Yorkshires
6		Polands	Tamworths	Chesters

These tables bear out the statement that there is no breed as a breed that can definitely be rated as the breed to make highest gains or highest profits but that more depends upon the individuality of the hogs.

This experiment has taken in some 69 hogs. Their grading according to breeds is interesting:

Breed	Selects	Thick Smooths
1. Yorkshires	11	1
2. Berkshires	6	6
3. Tamworths	6	6
4. Durocs	2	10
5. Chesters	1	8
6. Polands	0	12
	26	43

Of the 36 hogs of the three bacon breeds 23 graded select and 13 thick smooth, Yorkshires leading with 11 out of 12. Whereas of 33 of the lard breeds only 3 graded select, 2 Durocs and 1 Chester.

It is also interesting to note that not a single hog on the last two years of outdoor feeding covering 36 hogs in all lost money, and the profits were fairly

good. The only losses were experienced the first winter when too much milk was fed. In comparing Yorkshires, Berkshires and Tamworths fed outside last winter with the same breeds fed inside the following table is interesting:

Meal and meal equivalent for 100 lbs. gain.

Breed	Outside feeding	Inside feeding
	lbs.	lbs.
Yorkshires	569.2	532
Tamworths	549.2	480
Berkshires	464.9	386
Average	527.7	466

The work so far has shown that feeder pigs from 70-100 lbs. weight may be finished in outside runs with cheap shelters even in this climate and still make a reasonable profit. However, slightly cheaper gains are made inside but whether or not there is enough difference to warrant expensive construction of pens depends upon just how much these pens are going to cost.

From the entire series of experiments the following conclusions may be drawn:

1. Feeder pigs may be successfully finished in outside runs with cheap shelters in winter.
2. They make reasonable profits under such treatment.
3. In outside feeding or in very cold pens it is well to keep the milk and water used down to the minimum.
4. Pigs on inside feeding make 100 lbs. gain on about 60 lbs. less meal than those in outside runs in winter.
5. Breed tests prove that there is more in individuality and strain than there is in breed so far as economy of production is concerned.
6. There is no direct relationship between length of hog and length of small intestine.
7. There appears to be no correlation between length of small intestine and rate and economy of gains.
8. There seems to be a direct correlation between heart girth and capacity to handle feed.
9. That the Yorkshire is poorest suited to outdoor wintering. This breed seems to require more shelter than the others.

A MEMBER.—I would like to know if there is a breed of pigs in Canada that represents the Middle White pig of England?

PROF. TOOLE.—Some of our poorest type of Yorkshire as we know them would rank as Middle Whites but they are not really the Middle White breed of hogs. Middle White hogs were brought to this country some years ago but are not being bred here at the present time. They are usually described as large Yorkshires. We find the Middle Whites too short for our purposes in this country.

A MEMBER.—Did you mention how long it took to finish the pigs off?

PROF. TOOLE.—It took, roughly speaking, about three months. Some of them went in at 58 pounds and some of them weighed over 100. Generally speaking they went in from the middle of December to the first of January and went out from the middle of March to the first of April.

A MEMBER.—Is buttermilk as good as skim milk?

PROF. TOOLE.—I do not like buttermilk where there is any possibility of it containing a high percentage of salt. Salt in quantity is detrimental to hogs although they require small quantities of salt.

A MEMBER.—Is it not a fact that breeds are becoming more uniform of late years? I take it that conditions are very different to-day than they were a few years ago as far as type is concerned.

PROF. TOOLE.—As far as possible in selecting these pigs we try to get them true to type and typical of breed.

RECENT INVESTIGATIONS IN POULTRY HUSBANDRY.

PROF. W. R. GRAHAM, O.A.C., Guelph.

A problem of considerable national importance is the hatching power of eggs used for incubation.

There is a considerable variation in different parts of the country and among different flocks of birds.

We have been making some feeding trials, in a general way, as certain kinds of feed may influence the percentage hatch of fertile eggs from Barred Plymouth Rock pullets, when confined to pens, and when allowed to range in yards.

The hatches were started last year February 1st, the birds allowed in the yards April 21st, and hatching completed about May 24th.

The grain mixture used was as follows:

Mash—7 parts corn meal,
5 parts shorts,
3 parts ground oats.

Bone meal was fed in hoppers, also grit and oyster shell. Each pen was fed some cut alfalfa hay daily. The scratch grain consisted of equal parts whole wheat and cracked corn. The birds were fed about 6 pounds of whole grain to 4 pounds of mash.

Milk, Beef Scrap and Tankage were used as comparative sources of protein, with and without Cod Liver Oil.

Below is a summary of the results:

	Percentage hatched of fertile eggs set, when birds were confined to the house	Percentage of fertile eggs hatched when birds were allowed in the yards
1. Tankage	10.3	36.6
2. Tankage and cod oil	13.4	35.9
3. Beef scrap	6.0	33.7
4. Beef scrap and cod oil	23.9	58.5
5. Semi-solid buttermilk	43.6	50.4
6. Semi-solid buttermilk and cod oil	59.0	56.8

We are trying many methods to locate why there should be these variations in the animal feeds.

EXPERIMENTS IN REARING TURKEYS

An experimental turkey farm was started in the County of Norfolk last year. The farm consists, roughly, of one hundred acres of sandy land, not in a very high state of fertility.

Turkey eggs were purchased from farmers in the spring of 1926, and these eggs were hatched in incubators, and the poults were reared around coal burning stoves.

The feed used to start the poults was middlings, moistened with semi-solid buttermilk, to which was added two per cent. of cod liver oil. The turkeys had what green feed they would eat and some grit. As the turkeys grew, the ration was gradually changed to a mixture of 7 parts corn chop, 5 parts shorts and 3 parts ground oats, to which was added 3 per cent. of bone meal and 2 per cent. of cod liver oil. Some whole wheat was fed, also some buckwheat.

The following amounts of feed were consumed by 165 turkeys:

Feed	lbs.	Cost
Ground Grains	6,150	$126 25
Wheat	2,150	39 50
Corn	100	2 10
Buckwheat	2,500	40 00
Semi-solid Buttermilk	2,750	110 00
Coal used for brooding		13 30
		$331 15

Or, roughly, the feed cost was $2.00 per bird.

The average weight of the turkeys was thirteen pounds, and the local selling price, at Christmas, was 38 cents per pound, live weight.

A MEMBER.—Might I ask how long before hatching the eggs would it be necessary to commence feeding buttermilk and cod liver oil in order to get the effects of these feeds?

PROF. W. R. GRAHAM.—I would imagine it would take at least thirty days. If you can get lots of direct sunlight it would not be necessary to worry very much about it.

A MEMBER.—What effect on hatchability has the use of artificial lights?

PROF. W. R. GRAHAM.—The use of artificial light neither increased or decreased the number of eggs laid. It does have an effect upon the time when the birds will lay most of the eggs they do lay. In other words you can, by the use of artificial light, advance or retard the season of highest production. We are trying out some very interesting experiments with ultra-violet light just at the present time. I do not know yet just what the results will be.

A MEMBER.—Is there any difference in the effect of refined as compared with the crude cod liver oil?

PROF. W. R. GRAHAM.—We have used the finest oil we could buy and also the cheapest we could get and have used crude cod liver oil in the rough. There was little difference in the results. We pay less than a dollar a gallon for the oil we use.

A MEMBER.—What result would the feeding of fish meal instead of beef scrap have?

PROF. W. R. GRAHAM.—From work we have done I imagine that there would be no difference except that it might affect the flavour of the eggs. As far as price is concerned it would depend upon where you were. In Vancouver the fish meal would be cheaper than the scrap.

A MEMBER.—Have you ever used blood meal?

PROF. W. R. GRAHAM.—Blood meal is put into tankage to bring up the protein content. There is a lot of blood meal in tankage but blood meal alone would not give you all you require.

RECENT INVESTIGATIONS IN FARM ECONOMICS

PROF. A. LEITCH, O.A.C., Guelph.

The subject which has been assigned to me to-day is a discussion of the crop substitution which will be enforced upon those people unfortunate enough to live in the areas infested or threatened by the corn borer. When the injury to any farm enterprise from any cause becomes of such serious extent that it becomes necessary to take radical measures to reduce the amount of crop grown there can be only two alternatives. If there is no other crop of equal value which can be substituted the owners of the land must in the end suffer not only the immediately ensuing loss, but in addition there must be a process of reduction in the value of the land which will mean a further and very serious loss of capital to them. On the other hand if there is the possibility of substituting some crop of equal or higher value, then ordinary human initiative and courage will see to it that such substitution is effected as rapidly as possible and the net loss in revenue will not be disastrous.

Of course that is exactly what is going to happen in Essex county and other areas which have been and are afflicted with the scourge of the corn borer. The problem which is engaging us at this moment is to assemble all the facts in connection with the situation, including the study of the best possible distribution and use of the various substitute crops which may be regarded as of equal or higher value than the corn crop. This involves consideration of the market possibilities of such crops and the effect upon the market situation which will arise from the increased production of such crops.

Now these particular districts—that is the south western portion of Ontario including such counties as Essex, Kent and Lambton—have for a number of years already grown to some very considerable extent a number of crops which may be regarded as substitute crops of high monetary value per acre as compared with corn. It will therefore, be obvious that it must be some one or some combination of these crops which will best take the place of the areas previously planted in corn, which have had to be abandoned because of the ravages of the corn borer. In this way it will be possible for the net revenue of the farmer to be maintained or possibly increased. The chief difficulty, from the farmer's point of view, will be that he must reduce the acreage he devotes to the production of corn, to the amount which he can properly clean up afterwards in order to control the borer. The amount of the revenue he will derive per acre from corn will not be affected to any great extent if he uses proper control methods—the chances are that the corn crop under such conditions will have no difficulty in keeping ahead of the borer.

The first problem to be solved is exactly to what extent it will be necessary to reduce the acreage of corn to achieve that object. Entomologists are not recommending that the farmers completely abandon the growing of corn because there is a grave danger that such a procedure would disperse the borers and result in them attacking other kinds of vegetation in which control measures

would be more difficult and the results more disastrous than has been the case with corn.

With the object of finding out to what extent the acreage of corn would have to be reduced, we devoted this summer to a study of the crop programmes of some six hundred farmers and we found out that already the corn acreage had been remarkably reduced—especially in 1926. We used the statistics we obtained from 585 of the 600 farmers originally selected and found that there had already been a reduction of the corn acreage by fifty-six and a half per cent. We were extremely careful in our selection of these farms so as to be certain they should be representative and it is reasonable to assume that there has already been a reduction of at least fifty per cent. in the acreage sown to corn in south-western Ontario. Now we can calculate with reasonable accuracy the effect on net revenue if this acreage is sown to ordinary cereal and forage crops, and our surveys show us that the loss will amount to not less than $2,376,000 per annum or a loss of three dollars per annum on every acre of land. There can be only one effect of such a loss in net revenue and that is a reduction in land values to the extent of sixty dollars per acre.

This may not be a serious thing for the man who has his farm paid for and who is well established, but for the man who is in the process of paying for his farm or buildings, or in debt for his implements it means absolute ruination. His whole credit is built up on a land valuation of $150 per acre, and a reduction in the value of his land to $100 per acre would practically wipe out his credit.

So much for the injury which will be caused if in the process of substitution of other crops for the corn crop we can establish nothing but ordinary cereal or forage crops. The reason for that is not hard to discover. It is the peculiar fact that in the production of ordinary cereal or forage crops these corn counties, if we take the yield for the past twenty-five years, have no advantage over other good districts in Ontario. It was corn and corn alone which gave these counties of south-western Ontario their enormous advantage in the return per acre over other parts of the province which resulted in the high land valuation. The average yield of corn was seventy-four or seventy-five bushels per acre and we have no other cereal crop which will give an average return per acre of higher than forty or fifty bushels.

It follows from this, that we cannot look to the ordinary farm crops such as wheat, barley, oats and hay for satisfactory substitute crops to take the place of corn, except possibly in the case of those farmers who are well enough established to be able and willing to adopt the easier course and simply put up with a reduction in their annual income.

Now the next thing to decide is what crops will serve best as substitute crops. To begin with, for a number of years the area has demonstrated considerable experience in growing tobacco, beans, sugar beets, market vegetables and canning crops, such as peas, corn, tomatoes and it would appear that it will have to be some one or some combination of these crops, to which we may add soy beans, which must be used as substitute crops for corn. These are all crops which under existing market conditions will yield a net annual revenue higher than corn and it so happens that it will not be necessary, or advisable, for farmers to put the whole acreage which was devoted to corn into these substitute crops, but they can first plant a sufficient acreage to maintain their annual revenue and afterwards, if it is deemed advisable to extend the acreage devoted to such substitute crops. The present and most pressing problem is to keep up the level of their annual revenue and prevent thereby any serious and sudden drop in land values.

The next step is to examine the progress already made in substitution, for it is logical to encourage the increase in acreage of crops in the growing of which they already have had experience. We were surprised in examining the statistics from the six hundred farms selected as representative, to find the extent to which this substitution had already taken place. Of the seven thousand acres taken into consideration, nine hundred and forty-nine were planted out to tobacco and sugar beets and one hundred and sixty-eight to canning crops and some ten acres in market vegetables. That was quite a respectable amount of substitution. It meant that about thirteen per cent. of the whole acreage was already planted to crops of higher monetary value than the corn crops which had previously been grown. On the smaller farms, the substitution amounted to some twenty per cent. and they had only to proceed to the point where they had thirty or forty per cent. in these substitute crops when the productive value of the land would equal the figure at which it had previously stood. This represents the progress of substitution of only one year. Then in addition to these substitute crops there were some two thousand and fifty acres (or about twenty-eight per cent.) in cash grain, or grain sowed primarily for selling as grain and the balance of about forty-five per cent. of the seven thousand acres were in feed grain—that is barley and mixed grain which had been sown primarily to supply home grown feed which previously had been derived from the corn crops. There was a relatively small proportion of hay and forage crops because this land in their previous programme had been intended for the growing of corn and it would naturally not appear as under a forage crop in 1926. In addition there was a small percentage, about ten per cent., in miscellaneous crops, such as potatoes and soy beans.

The outstanding feature of the figures was that in the course of one year, thirteen per cent. of the whole abandoned corn acreage had already been placed under crops of a higher monetary value than corn. That substitution need only be trebled to solve the whole problem of the corn borer districts, but in the process of trebling there are certain features which will require very careful consideration.

One of these features is the effect on the markets for these products of such an increase in production. This is a most difficult and intricate thing to determine and yet it must be studied because it is obviously no use recommending the substitution of a particular crop that will be satisfactory from the cost of production and labour standpoint if the effect of the substitution is to lower the market price of the crop.

So the next thing entailed was a study of the market possibilities of these particular crops, following which there is the livestock angle to this thing which is extremely important. We cannot divorce the question from the livestock content. The lessening of corn production means a lessening of the number of hogs raised and so on. So it comes to this, that only forty per cent. of the acreage hitherto devoted to corn must be utilized in growing these higher priced produce—the balance of sixty per cent. must be utilized for the production of the necessary cereal and forage crops to provide for the livestock. Moreover, it is important that farmers should take advantage to the fullest possible extent of this acreage devoted to cereal and forage crops by having the most desirable class of livestock. We know from experience that dairying is usually the best revenue producer of any class of livestock production. No one will deny that it is a much more remunerative business than mixed farming. However, here again, we are faced with the necessity of considering other factors. Dairying is not a business which appeals to all classes of farmers nor have all of them the

necessary experience in dairying. If we recommended all farmers to adopt dairying we would undoubtedly have a large proportion of poor dairymen for the first twenty years and a good beef man will always make a lot more money than a poor, or even a moderately good dairyman.

The fact of the matter is that in this respect, we shall have to place before each individual farmer, all the facts of the case and then let him decide for himself what is the best course for him to adopt after considering all the attendant circumstances. I do not think it would be a wise course to stress the importance of dairying notwithstanding the fact that on the average, it is a higher revenue producer than other branches of livestock.

In this problem of substitution, we have an enormously wide variety of conditions and circumstances to meet, and no effort can be successful unless it takes into consideration the needs of the individual farmer. Any theory to be effective in practice, must be broad enough to cover all conditions.

Now just a word or two as to the market possibilities of the crops I have mentioned—tobacco, sugar beets, market vegetables and canning crops and perhaps soy beans. Our study of the tobacco market a year ago and again this year, demonstrates the fact that tobacco production has increased quite rapidly at times and then as lower prices naturally came, the production immediately dropped as rapidly. Now that is not a condition which makes for the satisfactory development of a market. Production must be maintained with reasonable uniformity. The main reason for the fluctuation in the production of tobacco was that as soon as there was a lowering of prices owing to heavy production the farmers turned to corn which was pretty nearly as profitable per acre. Now this condition will be changed, for no longer will the farmer have the same chance to grow corn. Instead the production of tobacco will be maintained. The tobacco industry will have a chance to become well established and the most important point to be considered is that we have an excellent market. The British preference of two shillings per pound on Empire grown leaf is quite sufficient to provide overseas a market for all the raw leaf of the proper kind that we can grow. We have that to start with, but to maintain a market there must be a permanent and steady supply of the product and there is promise of this now that the farmers of that area who can grow tobacco will no longer have the opportunity of going out of tobacco to grow corn.

In regard to sugar beets we have an entirely different market condition and I am not prepared at the present moment to make any definite statement as to market possibilities. We must take a little more time to study the market. It is a fact that we could put the whole of south western Ontario into the growing of sugar beets and not produce more than sufficient to supply the requirements of the Dominion. The point is, can we profitably compete with other sugar growing areas for the Canadian market? The two factories which are already in operation in the territory are doing well, but they have had a very chequered career and it is a question whether other factories could be profitably established to take care of a greatly increased production of sugar beets. The conditions for growing sugar beets so far as soil and climate are concerned are ideal in south western Ontario, but the position of the factories from the transportation standpoint both for raw and refined products, are not so ideal and it is made worse to some extent by the provisions of the recent British West Indies agreement which forces raw sugar for refining purposes to go all the way around by Canadian ports. The point to be decided is, whether additional factories to take care of a greatly increased acreage of sugar beets can under all the circumstances, be established and carried on profitably.

With respect to canning crops, the market conditions in Canada are not so hopeful. There are other countries, Italy for instance, which can compete with American grown products right in the United States. That means that the expansion of the market for canning products such as tomatoes and peas, can only be proportionate to the increase in domestic consumption of such products in Canada and that situation does not hold out any great promise of improvement.

Soy beans as an industrial oil producer have considerable possibilities and will have to be tried out as an experiment by public or private enterprise. If there can be a sufficient quantity grown to justify the putting up of a manufacturing plant it might be a most profitable crop, but here again the possibilities of foreign competition would have to receive very careful consideration.

There is the production of grapes, but we cannot recommend any extension in this line because the enormous increase in the profits of grape production was largely due to the Ontario Temperance Act and with modifications of that Act in view it would be extremely dangerous to make any suggestions as to the possibilities in that line.

Finally there has to be considered the human factor. Any substitution of other crops in the corn area necessarily means if it is to be successfully accomplished a satisfactory supply of adequate, efficient hand labour and we are recommending, in order to solve this problem satisfactorily, the setting up for south western Ontario of a separate farm labour bureau which will confine its activities to finding and supplying the special kind of labour to fill the labour demand which will be required in the substitution. The situation is the more involved because not every farmer concerned will desire to grow these particular crops. This will depend to a very large extent upon individual financial position, but there is a large class which will have to make substitution in order to exist and it will be to meet this demand that the Farm Labour Bureau will be established. Both sugar beet and tobacco cultivation demand a great deal of hand labour and tobacco in addition requires the investment of a large, comparatively speaking, amount of capital.

So you see the question of crop substitution will depend upon the circumstances of the individual farmer. Soil and climatic conditions—some areas for example are not suitable for all varieties of tobacco—then the financial condition of the individual and his labour facilities, his initiative and courage in attempting to solve his own problems. Under these circumstances and conditions it would be foolish to make any one general recommendation intended to meet the needs of every individual, but it will have to be some one or some combination of these various suggestions and the exact working out of the plan will have to be left to the resourcefulness and initiative of the individual.

Mr. D. Z. Gibson.—This is a very serious matter indeed for the farmer in south-western Ontario. It is no joke to have to make a radical change in farming systems which have been successfully followed for years. How about growing alfalfa in this area? If the soil is suitable it should be a good substitute crop. It will produce a revenue of fourteen dollars an acre clear and does not take a great deal of labour. Then take the wheat crop. A good farmer will grow thirty or even forty bushels per acre. At present prices this gives a revenue of $40 or $50 per acre, and would be a good substitute crop in south-western Ontario.

A Member.—I would like to ask if it is not the general opinion that land values in the areas affected by the corn borer have been more or less inflated

of recent years, owing to speculation in real estate. Do these land values really represent the actual value of the land for productive purposes?

PROF. LEITCH.—There is no doubt that land values in those sections have become too high, not only because of the demonstration of their ability to grow high priced crops, but from a purely speculative point of view, owing to the rapid development of the border cities. Apart from that, there has been sufficient justification in the history of the past quarter of a century for a land value of eighty or one hundred dollars per acre greater than the value of land in the mixed farming and dairy sections of the province.

SUCCESSFUL ERADICATION OF PERENNIAL WEEDS

PROF. A. C. ARNY, AGRICULTURAL COLLEGE, UNIVERSITY OF MINNESOTA

In order to cope successfuly with any weed it is necessary to be able to recognize it and to know accurately its habits of growth.

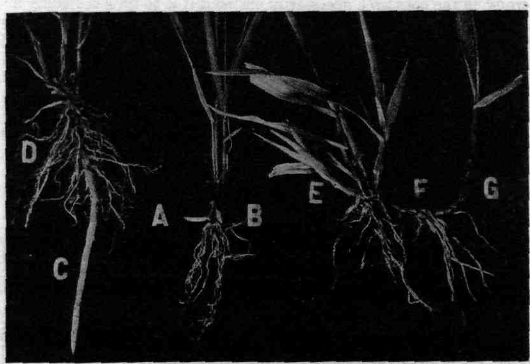


Fig. 1. Quack Grass Seedlings (May 27, 1910).

The plant in the centre is just starting an underground stem, A. The hull of the seed is seen at B. The plant at the left is older and the underground stem, C, and the feeding roots, D, are well developed. The plant at the right shows a still larger stage of development. The stems of the seedling are shown at E. The underground stem, F, has produced a new plant, G.

Quack grass, often called twitch grass, matures its seed mainly in July. However, the seeds on plants cut for hay before the plants are mature will grow. Some of the seed falls to the ground the same season and germinates if the conditions are favourable and others germinate the next spring. Up to six to eight weeks old the seedlings are as easily killed as wheat seedlings. At about that time they begin to develop the underground stems and eradication becomes increasingly difficult. It spreads long distances by seed in grain for sowing, in hay or straw and in manure. It spreads slowly in fields if undisturbed, and

more rapidly when the tough underground rootstocks are dragged from infested spots to uninfested areas by farm machinery and by the hoofs of work horses.

If left undisturbed, the rootstocks grow near the surface and the plants become sodbound. When the infested ground is plowed regularly or occasionally, the rootstocks grow deeper and the growth is more vigorous.

Perennial sow thistle differs somewhat in its methods of spread and development from quack grass. The seeds are produced largely in July and up to the middle of August. The fruits are equipped with an apparatus that enables them to be carried long distances by the wind. The seeds are capable of germination as soon as they are mature. When moisture conditions are favourable, some seedlings become established in midsummer and others in the spring.

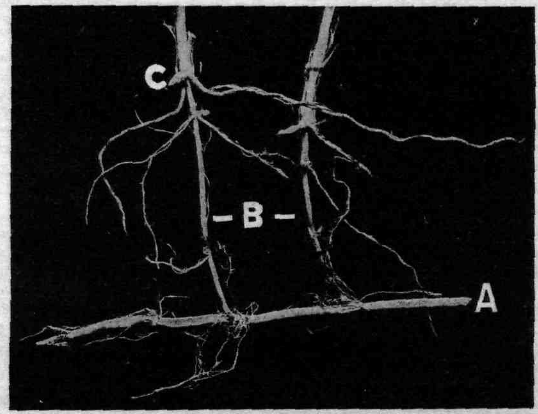


Fig. 2. Quack Grass Plant.

A. An underground stem, two and a half inches below the surface.
B. Two branches which have produced stems and leaves.
C. New underground stems starting just below the surface of the soil. When these are well developed the old one will die.

They begin to produce the thickened roots by which they spread short distances in from six to eight weeks and may produce flowers in three months.

The thickened horizontal and vertical roots are very brittle and hence are removed completely from the soil with much greater difficulty than the underground stems of quack grass.

The seeds of Bladder Campion are spread largely in clover seed. The thickened underground parts grow somewhat deeper than those of quack grass or sow thistle and they are brittle.

The seed of Field Bindweed ripens in August and is carried mainly in seed grain. The underground thickened parts by which it spreads short distances are brittle and hence difficult to remove completely from infested spots.

Underground Parts Persistent

Each one of the four weeds mentioned spreads by thickened underground parts as well as by seeds. These underground parts are a means of spread and serve also as storehouses of reserve food materials. Starchy materials are formed by the leaves of plants and proteins built up at all times of the season during which the leaves are green. During the latter part of the summer and the fall undisturbed plants usually produce more of these food materials than are needed for immediate growth and the excess is stored in the thickened underground parts. A small part of these reserve food materials is used during the winter and in spring they are drawn upon heavily to make possible the very rapid growth that these plants make as soon as growing conditions have become favourable. By the time the plants have come to the beginning of bloom stage, the supply of reserve materials in the underground parts is about at its lowest point and killing out of the plants easiest at that time. However, it is not always advisable to wait to begin eradicating these weeds until this time.

Methods of Control and Eradication

Since each of the four of these weeds spread within the field, from one field to another and from farm to farm by seed distribution or by the underground parts of both, it is necessary to take care of the means of re-infestation before it pays to go to the expense necessary for complete eradication.

Prevent Seed Formation

It is necessary to cut the weeds in the spots or in the entire fields where it has spread to that extent not later than when the first flowers begin to bloom. Seeds form quickly so the cutting must take place promptly at the appearance of the first flowers or a few days earlier than that in order to be effective in preventing seed formation. Particularly with sow thistle, which has wind borne seeds, it is necessary to keep roadsides and adjoining fields free from seed producing plants if re-infestation is not to occur. Where unoccupied land is infested it must be either mowed or kept pastured down to prevent the plants from producing seed.

In addition to preventing seed formation, it is necessary to be very careful to use only seed grain, grass and clover seed that is entirely free from seed of these noxious weeds. If hay or straw contains seeds of these weeds, it is necessary to see that the vitality of these seeds is destroyed before they get to the fields.

Eradication of Small Patches

Where these weeds occur in fields in a few isolated spots it is always desirable to follow a method that will prevent dragging of the underground parts out into the uninfested portions of the field. Several methods have been tried and found effective in bringing about complete eradication of comparatively small isolated spots.

Digging by Hand. Small areas if not too numerous, may be handled this way any time during the growing season. The tough underground stems of quack grass may be separated out more easily and completely than the more brittle parts of the other weeds. It is always necessary to go back several times to remove plants that were not seen at first and those that develop from small pieces of underground parts that remained in the soil. This method is labourious

and is practical only where the spots are few in number, small in area and the necessary labor is available.

Covering with paper three or four feet beyond the edges of the spots on all sides, lapping the paper six to eight inches and weighing it down with soil to keep in place, has been found to be effective when thoroughly carried out. It is necessary to use tar paper or a grade of building paper that will stand wetting.

Chemical sprays, particularly sodium arsenite, applied at the rate of six to eight pounds dissolved in twenty to twenty-five gallons of water and applied to a one square rod area will kill the plants and at the same time render the soil sterile for a considerable time. Sodium arsenite is a deadly poison.

Eradication on Badly Infested Fields

For complete eradication on badly infested fields, clean tillage is the most practical means to accomplish results. The principle on which the practice is based is the prevention of the storage of reserve food materials in the underground parts by keeping at all times any green leaves from showing above ground. With all opportunity for replenishing the reserve materials cut off the supply present at the start is gradually used up and when it is exhausted death is inevitable. Field bindweed which is probably the most difficult to eradicate, has been found to succumb to this kind of treatment.

Careful Planning Necessary

By referring to the table in this article, some idea of the number of operations necessary to accomplish results may be secured. Operations for complete eradication should be confined to an area that can be handled effectively throughout the entire growing season. The time when a certain operation is done and the way it is done, are very important. Much work may be done on a field in a season and little accomplished toward complete eradication. This should be the central thought in the work throughout the season: *Each operation must make good all the previous work and do its share toward complete eradication.* In order to accomplish results, the right operation must be given the field promptly each time the plants *begin to show above ground.* Waiting ten days or two weeks until hay making or harvest are over, lessens the effectiveness of the work that has gone before and consequently makes more work necessary to accomplish complete eradication. What is accomplished each time over as well as the number of times over, is important.

No Special Implements Necessary

No special implements are necessary in weed eradication work. Good work can be done with the plow and disk. A good duckfoot cultivator is an effective implement.

Plowing is the first operation and everything should be turned under clean. A plow equipped with a jointer is more effective in doing a good job of plowing than a plow lacking that equipment.

The disk or the duckfoot is used to cut off the new sprouts as they begin to appear through the soil. It is important to understand that the disk or duckfoot should be used as the new shoots are beginning to come through and not after the field has become green.

Smother Crops do not Smother

So-called smother crops such as buckwheat, millet, rape, grow rapidly and prevent the weeds from making much headway while these crops are on the field. However, they do not smother the weeds out. Their main advantage besides holding the weeds in check while they are growing, is that they are quick growing crops and give opportunity for clean cultivation for some time before and after their growing period. Cultivating as needed to July first and then planting to buckwheat following again with tillage as soon as the buckwheat is removed has been found to be effective. When the field is badly infested, two or three years in succession of this treatment may be necessary for

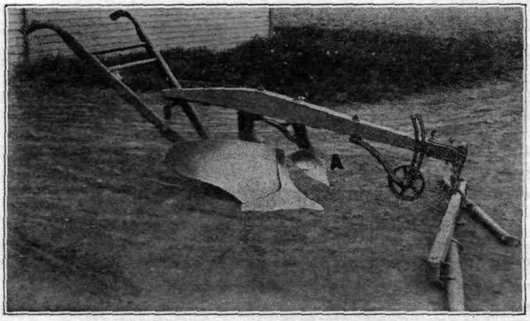


Fig. 3. Plow with Jointer.

With a plow equipped in this manner stems and leaves in a tough sod can be covered completely. The jointer is shown at A.

complete eradication. Any other quick growing crop could be used instead of buckwheat.

Rotation Gives Opportunity for Eradication

The usual cultivation given the land in raising crops in a good rotation, will not ordinarily eradicate completely any one of the four noxious weeds mentioned. However, there is opportunity in the rotation to give the additional cultivation that is necessary for complete eradication.

The best opportunity for complete eradication in a rotation, is following the removal of the hay crop in July, up to corn planting time the following spring.

As soon as the hay crop is off the ground, it is plowed four to five inches deep, using care to turn all the growth under completely. The disk is used immediately after and in the same direction as the plowing as needed to make a good mulch. Following this the disk or duckfoot is used as often as new shoots begin to appear at the surface.

The number and dates of the operations needed to keep quack grass shoots from showing green above ground on a field in Wright County, Minnesota, are given in the table. Eight diskings were necessary between the time the field

CLEAN-UP TIME ON A FIELD IN ROTATION

Operation	No. of Operations	Dates	Manual Labour		Horse Labour	
			Hrs.	Min.	Hrs.	Min.
Plowed..........	1..............	July 25 and 27..........	15	37	31	14
Disked..........	1, 2 and 3.....	July 27, Aug. 6 and 15....	16	43	33	26
Disked..........	4, 5 and 6.....	Aug. 27 and Sept. 4 and 11	16	58	33	56
Disked..........	7 and 8.......	Sept. 17 and Oct. 19......	10	56	21	52
Cultivated.......	....	April 22.................	4	45	9	30
Manured........	1..............	April 28, May 1 and 5....	21	......	42	......
Disked..........	9, 10 and 11...	April 30, May 5 and 13...	11	......	22	......
Harrowed.......	1..............	May 13.................	2	30	5	......
Marked and planted.......	....	May 13, 14, 16 and 17....	8	......	5	......

was plowed on July 25 and 27 and freezing up time to keep the young shoots off. This required twenty-eight hours and thirty-seven minutes of man and eighty-nine hours and fourteen minutes of horse labour above what would ordinarily be given. The field was 2.85 acres in area. In the spring, the field was cultivated in April, followed by three diskings in April and May before corn planting time. Seven and one half hours of hand labour was necessary to remove weeds from the corn hills in this field during the growing season. The amount of extra work necessary for complete eradication will vary for different weeds under different conditions, but this gives some idea of the amount necessary and will aid in determining on how many acres of eradication should be attempted each year and about what the cost will be in extra labour.

Following this method has the advantage of securing a crop each year and still making eradication complete on one field or part of a field each year.

PROF. J. E. HOWITT.—Conditions prevailing in the State of Minnesota, are very largely the same as in Ontario. I would very much like to have had Professor Arny tell us something about killing field bindweed. Our weed problem in Ontario is becoming more and more acute each year and in parts of Wellington county, sow thistle even threatens to drive farmers off their holdings. One of the chief difficulties in connection with this problem is the necessary labour to cope with the situation. We can do something with crop rotation and with labour saving devices, but neither of these methods will avail while weed seeds are blown on our farms from the roadsides and waste places and one of our needs is an effective and enforced Weed Act. You know we have a Weed Act and perhaps you know that in the past this has largely been a dead letter. Some sections of this Act have been enforced but many others have not been effectively enforced. I understand that the revision of the Weed Act is under consideration. I would like to analyse some of the points in the old Act which I consider have been weaknesses and make some suggestions for betterment in the new Act.

In the first place the enforcement of the Act is entirely in the hands of the local municipalities and you have all had more or less experience of the weakness of that method of enforcement. There should be some provision in the Act for a central system of control which would see that local inspectors would carry out their duties. I have been surprised in speaking before county councils, how little they knew about their powers under the Weed Act.

In the old Act it stipulated that local authorities should appoint a weed inspector upon the petition of fifty or more farmers. It is decidedly difficult

to get fifty signatures to a petition of this nature. The number of petitioners should be reduced to ten or fifteen at the outside.

There should be a revision of the list of weeds which are considered noxious. One of our worst weeds, the perennial sow thistle, is not even mentioned in the present list. In addition to the revision of this list, some provision should be made in the Act to permit of the addition of other weeds not mentioned which might, from time to time, be introduced into a district and become noxious.

Under the present Act, the minimum penalty is $5.00. It would seem advisable in the new Act that the minimum be raised to not less than $20.00. With these brief suggestions I will leave the subject with you for your consideration. I cannot too strongly impress upon you the necessity of adequate protection to the farmers who are doing their utmost to meet this menace to the agricultural industry.

MR. W. J. W. LENNOX.—I cannot see why, if we use the proper methods of control, we cannot keep the inroads of weeds in check. I think the first thing to do is to consider the cause of the spread of weeds throughout the country and then through wise and efficient legislation strike at the root of the problem by controlling the spread. It is the duty of the state to look after roadsides and waste places generally. This leaves the problem of dealing with the weeds on the average farm, the problem of the individual farmer. He has such control measures as rotation of crops, thorough cultivation, and the purchase and use of only the best seed.

I would like to refer briefly to this last point as it is, in my mind, the chief cause in the spread of weed seeds. We frequently find that a year or so after farmers have sown seed, particularly clover seed, they claim that they have received a dose of weed seeds. Now that state of affairs is not at all unavoidable. If the farmer treated his business as other business men do, he would find out the impurities in his seed before he sowed it.

MR. T. G. RAYNOR.—Couch grass is taking a heavier toll in this province year by year than any other weed, and the last season was a particularly good one for the spread of this weed. I wish to impress upon this gathering the necessity of following the most effective methods for its eradication. We cannot over-emphasize the importance of the use of good clean seed. When the soil is brought into a good state of cultivation and is comparatively free from weeds and only the best seed sown it is not difficult to keep weeds under control.

Another factor in this problem is the amount of land under cultivation by individual farmers. We are trying to work too much land with too little labour. We need an educational campaign in our rural schools so that the boys and girls will be taught the importance of this subject and given a knowledge of how this menace may be most effectively controlled.

A MEMBER.—Suppose you intended summer-fallowing a meadow, how soon would it be advisable to start plowing and could you sow fall wheat that year?

PROF. ARNY.—That depends on exactly what you want to do with it and how badly infested the land is. If you start in the spring you should have the land in pretty good shape for fall wheat. Weed plants are lowest in stored up plant food in the month of June, but I would not always advise waiting until June to start operations to kill weeds as this brings you into the harvesting period and more might be accomplished by starting somewhat earlier in the season.

Ontario Department of Agriculture

REPORT

OF THE

Ontario Veterinary College

1926

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

Report of the

Ontario Veterinary College

To The Honourable John S. Martin,
Minister of Agriculture.

Sir,—

I have the honour to present herewith the following report of the Ontario Veterinary College for the year extending from November 1st, 1925 to October 31st, 1926.

Commencement Exercises

The Annual Commencement Exercises and Presentation of Prizes took place on November 12th, 1925. The attendance was exceptionally good and filled the Assembly Hall to capacity. Special addresses were delivered by George A. Drew, Mayor of the City of Guelph, and by Dr. F. C. Grenside, a distinguished graduate of the College. On behalf of the College I presided as Chairman. In the course of my remarks I welcomed those present and alluded to the gratifying increase in the attendance and the splendid type of young men taking the course, also that the history of the veterinary profession was largely identified with and dependent on the prosperity of agriculture. Moreover, that the College through its alumni, would in the future as in the past, have a large part to play in the development of profitable agriculture through safeguarding and promoting the health of live stock, and in the control and suppression of preventable animal diseases. The graduate in veterinary science could truly feel that he was going forth to do a useful work and one that was necessary for the good of the state and its people. Not only were veterinarians useful in promoting profitable animal industry but also in protecting human beings against diseases of animals to which they are also liable. This was being largely accomplished through various professional channels pertaining to the inspection of meats and of milk. Dr. Grenside in his address congratulated the college for the good work it had done and asserted that the reputation it had gained was well merited. He referred to the changing conditions and modern tendencies in general and while no doubt in some respects improvements were taking place at the same time he cherished a deep regard for many of the older fashions and customs. As a member of the City Council and of the Board of Health, Dr. Grenside has taken a great interest in all phases of health work and he was pleased that the City of Guelph had now put into operation a milk and meat ordinance under the direction of a qualified veterinarian thus ensuring for the citizens a sound and wholesome meat and milk supply. The health of the people was always of prime concern and should not be measured by its cost, which after all was negligible. Some people failed to realize the benefits accruing from health measures and others erroneously thought that the inspection of dairies and milk increased the cost of the commodity. He could, however, assure those holding this idea that the price of milk had actually been shown by economists to have decreased in those cities where such inspection was main-

tained and that consumption of milk had correspondingly increased. Mayor Drew prefaced his address with special reference to his personal pleasant associations with the College as lecturer in Jurisprudence. Speaking in his capacity as Mayor of Guelph, he expressed the real pleasure felt by the citizens of Guelph at having such an educational institution as the Ontario Veterinary College located nearby. There was a decided advantage in the location at Guelph in that urban and suburban advantages prevailed, thus assisting in developing the college spirit to a higher extent than would be possible in the centre of a larger metropolitan city. At a gathering of this kind he felt there was a feeling symbolical of life in its fullest sense. Achievement was being rewarded and to this extent striving would be renewed. If such were not the case life would indeed be a sorry spectacle. In giving a message to the students he emphasized the need of faith in themselves and in the profession with which they were to become identified, and in their country. This he considered to be one of the important things they could carry away from college. After all these were the things that made life worth while. The possibilities of the country were limitless and provided a sure foundation for faith and achievement. Mayor Drew then presented the prizes to the successful candidates in the different subjects and congratulated the winners.

Student Enrolment

The student enrolment is still being maintained although a slight decrease occurred this year in the first year class. This decrease was, however, compensated for by an increase in the other years. For the session ending April 30th, 1925 a total of 66 students were in regular attendance, of which 21 were in the first year class, 21 in the second year class, 12 in the third year class, and 12 in the senior class. Of the senior class the 12 successful candidates were graduated with the degree of Bachelor of Veterinary Science (B.V.Sc.) conferred by the University of Toronto at a Special Convocation held on May 1st, 1926. During the present session, which commenced on October 1st, 1926, a total of 67 students have registered, of which 15 are in the first year class, 21 in the second year class, 20 in the third year class, and 11 in the senior class. It is gratifying to report that the requirements for entrance are being fully recognized and as a result the basic education of matriculants is now established on a more uniform standard.

The Teaching Staff

The personnel of the college staff has not been materially changed. During the year, however, Mr. George A. Drew, Lecturer in Jurisprudence, having accepted an official position in Toronto, had to remove from Guelph and we were fortunate in securing in his place Mr. Angus Dunbar. The staff is now as follows:—

C. D. McGilvray, M.D.V., D.V.Sc., Principal: Contagious Diseases, Sanitary Service.
J. N. Pringle, M.R.C.V.S., B.V.Sc.: Sporadic Diseases, Dentistry.
R. A. McIntosh, M.D.V.: Diseases of Cattle, Obstetrics, Pharmacy, Therapeutics.
W. J. R. Fowler, V.S., B.V.Sc.: Surgery, Lameness, Materia Medica.
H. D. Nelson, B.V.Sc., D.V.Sc.: Anatomy.
R. Gwatkin, B.C.Sc., D.V.Sc.: Bacteriology, Milk Hygiene.
H. E. Batt, V.S., B.V.Sc.: Zoology, Histology, Meat Hygiene.

F. W. Schofield, B.V.Sc., D.V.Sc.: Pathology, Parasitology.
J. G. Harvey, V.S., B.V.Sc.: Canine and Feline Diseases.
L. Stevenson, B.V.Sc., M.S.: Physiology.
Angus Dunbar: Jurisprudence.
A. L. Shepherd: Executive Clerk.
Miss A. Le Grand: Librarian and Secretary.

The Course of Study and Instruction

The course of study and instruction is being adjusted from time to time as appears necessary to meet the needs. Owing to the wider demands being made for graduates available for research and investigational work advanced courses in laboratory technique and diagnosis are given so that a greater number of men will be qualified for such work. This has been particularly the case in regards to poultry diseases, and a special course is now given in that branch. The general aim has been to diversify and improve the course so as to more adequately equip graduates to perform the services which the community expects of them. Veterinary students receive instruction in the subjects of chemistry, animal husbandry, botany, English, civics and economics, from the staff of the Ontario Agricultural College, and agricultural students receive instruction from the staff of the Ontario Veterinary College in the subjects of elementary anatomy, materia medica, obstetrics and preventable diseases of farm animals. The details regarding matriculation requirements and an outline of the studies and the course of instruction are contained in the College Calendar which is distributed to those interested.

Research and Investigational Work

Much routine work is carried on by the college staff in addition to their regular class lectures, laboratory and other instructional work. Special research and investigational work is performed in so far as time, opportunity, and facilities permit. This is a valuable feature for many reasons apart from the immediate results. It is especially valuable in fostering an atmosphere and incentive to the thoughtful minded, diligent, painstaking student to pursue such studies as will develop a bent of mind for research work. The demand and need for research workers is generally realized but the number of persons inclined and qualified for the purpose are relatively few owing chiefly to the lack of opportunity afforded. This is to be regretted but may be overcome when sufficient inducement is offered and the required facilities become available for further expansion to attract research workers in Canada. That a reasonable number of men could be profitably employed in research and investigational work is becoming evident by the increased enquiries received from stock owners and veterinary surgeons for information and assistance in respect to nutritional diseases, as well as infectious and parasitic diseases. Likewise, an increasing demand is arising for the investigation of diseases of poultry and of silver or black foxes. The assistance extended by your Department through the College has been fully appreciated by those receiving benefit. During the year the following work has been undertaken and is now submitted as special articles forming part of the general report of the College.

Sterility cases in cattle.
Intersexuality in mammals.
The black fox industry in Ontario.

Pullorum infection in poultry.
Bacteriophage experiments.
Experiments on the disinfection of eggs and incubators.
Veterinary science in Japan.

Extension Service

An extension service is being gradually developed along such lines as appear most helpful. Veterinary Surgeons and owners of animals are now frequently availing themselves of this service by sending specimens to the college for laboratory diagnosis. In such cases a detailed laboratory report is sent as quickly as possible to the one concerned. This service is now being availed of by poultry raisers for the detection of pullorum infection causing white diarrhoea in chickens. For this purpose approximately twenty thousand blood serum examinations have been made. This, in addition to the routine examination of diseased specimens, has greatly added to the college work and entailed much over time owing to shortage of help. Likewise, fox ranchers are now finding it incumbent to make it a routine practice to have periodical examination of their foxes made for parasitic infestations. For this purpose the microscopic examination of fox feces has been undertaken by the college staff in so far as their time and other duties will permit. A large amount of abortion vaccine has also been prepared and furnished to practising veterinarians on request of owners desiring to have their cattle vaccinated for infectious abortion. Approximately five thousand doses of abortion vaccine have been prepared and distributed under this policy and in the case of many herds the reports received so far have been quite favourable as regards the use of the live culture vaccine in badly affected herds.

These various activities and services are mentioned under their respective departmental headings in the subjoined reports.

All of which is respectfully submitted.

C. D. McGilvray,
Principal.

Guelph, Ontario,
October 31st, 1926.

CLINICAL DEPARTMENT

The work of this department embraces the applied branches of veterinary medicine and surgery. All animals brought to the College are carefully examined after which treatment is prescribed and operations are performed as may appear advisable. Complete records are kept of all cases and the available material is made use of to impart instruction to the students by regular lectures and special demonstrations. The clinical instruction has been carefully arranged and field investigations have been conducted whenever possible. Much time has been devoted to infectious abortion and sterility in cows. Many valuable cows have been treated for sterility at the College, and as a result a considerable number have been restored to breeding usefulness. Several special articles relating to interesting cases have been prepared and are embodied in the report. The different clinical cases used for instructional purposes are included in a report submitted by the clinical department of which the following is a synopsis

Black Foxes

Number of Animals	Nature of Case	Remarks
13	Ear Mites	Medicinal treatment.
23	Hookworms	" "
2	Malnutrition	" "
1	Fractured Metacarpus	Surgical "
6	*Lung worms*	*Post-mortem* examination.
1	Ascariasis	" "
2	Pneumonia	" "
1	Diseased Liver	" "
3	Abdominal Hemorrhage	" "

Swine Clinics

5	Malnutrition	Correction of diet and care.
15	Scours	Medicinal treatment.
1	*Cryptorchid*	Surgical operation.
1	Umbilical Abscess	" treatment.
3	" Hernia	" operation.
20	*Necrotic Stomatitis*	Medicinal treatment.
9	Scrotal Hernia	Surgical operation.
11	Castration	" "
39	*Pig Pneumonia*	
6	Rheumatism	Sanitation and proper care.
1	Constipation	Medicinal treatment.
1	Mammitis	" "
1	Paralysis	" "
1	Inguinal Hernia	Surgical operation.
1	Nervous Affection	Medicinal treatment.
13	Sarcoptic Mange	" "
1	Convulsion	" "
1	Actinomycotic Tumor	Surgical removal.
1	Lung worm	Post-mortem examination.
1	Convulsion	" "
2	Rheumatism	" "
1	Gastro-enteritis	" "
3	*Pig Pneumonia*	" "

Sheep Clinics

34	Stomach Worm	Medicinal treatment.
5	Mammitis	" "
4	Tapeworm	" "
1	*Umbilical Hernia*	Surgical "
1	Tumor of Shoulder	" "
2	Prolapse of Vagina	" "
3	Dystokia	Obstetric "
1	Pediculosis	Medicinal "
1	Dental Irregularities	Surgical correction.
1	Abscess	" treatment.
1	Tetanus	Medicinal "
1	Edema	" "
1	*Pleuro-pneumonia*	*Post-mortem* examination.
1	Empyemia	" "
1	Triple Pregnancy	" "
1	Uremic Poisoning	" "
1	Parasitic Gastritis	" "

CATTLE CLINICS

Number of Animals	Nature of Case	Remarks
288	Tuberculosis (Tuberculin Test)	2 reactors; 286 negative.
21	Sterility	Manual treatment
23	Ringworm	Medicinal treatment.
10	White Scours	" "
5	Diagnosis of Pregnancy	3 positive; 1 negative.
5	Indigestion	Medicinal treatment.
6	Dehorning	Surgical operation.
5	Abscess	" treatment.
3	Supernumerary Teats	" removal.
3	Warts	" "
3	Urethral Calculi	" "
2	Actinomycotic Tumor	" "
2	Dyspepsia	Medicinal treatment.
3	Stricture of Teat	Surgical "
3	Lameness	Medicinal "
1	Chronic Tympany	" "
1	Ventral Hernia	No treatment.
1	Papilloma	Surgical removal.
2	Teat Tumor	" treatment.
2	Dystokia	Manual "
2	Diarrhœa	Medicinal "
1	Pulmonary Congestion	" "
1	Chronic Mammitis	" "
1	Pectoral Abscess	Surgical "
1	Choking	Manual "
1	Prolapse of Rectum	Surgical "
1	Fracture of the Femur	No "
3	Mammitis	Medicinal "
2	Urticaria	" "
5	Retained Placenta	Manual "
4	Foul in the Foot	Medicinal "
2 herds	Abortion	Advised "
3	Parturient Paresis	Udder inflation.
2	Eczema	Medicinal treatment.
3	Broncho-pneumonia	" "
1	Lacteal Fistula	Surgical "
1	Corneal Opacity	Medicinal "
1	Hygroma	Surgical "
3	Metritis	Medicinal "
1	Ulcers on the Tongue	" "
1	Tumor of the Reticulum (Actinomycotic)	Post-mortem examination.
2	Hemorrhagic Septicemia	" "
2	Broncho-pneumonia	" "
1	Cystic Calculi	" "
	Demonstrations of Restraint	Work done by students.
	" of Sterility Manipulations	" "
	" of Tuberculin Injecting	" "
	" of Bleeding for Agglutination	" "

Horse Clinics

Number of Animals	Nature of Case	Remarks
42	Dental Cases	Manual treatment.
13	Fistulous Withers	Surgical "
5	Thrush	Medicinal "
4	Poll Evil	Surgical "
4	Sesamoiditis	Counter irritation.
5	Laryngeal Hemiplegia	Surgical treatment.
5	Symbiotic Mange	Medicinal "
3	Verrucose Dermatitis	Surgical "
6	Navicular Disease	Counter irritation.
6	Indigestion	Medicinal treatment.
5	Shoulder Sores	" "
3	Nail Punctures	Antiseptic "
2	Intestinal Parasites	Medicinal "
3	Constipation Colic	" "
1	Granulomatous Growth	" "
1	Aneurysmal Colic	" "
1	Tetanus	" "
1	Nervous Condition	No "
3	Serous Sac	Surgical "
1	Sprain of Tarsal Joint	Medicinal "
1	Locomotor Ataxia	" "
2	Poll Evil and Fistulous Withers	Surgical "
1	Coronitis	Counter irritation.
1	Exostosis of Os Pedis	" "
1	Quittor	Surgical treatment.
1	Sprain of Coffin Joint	Counter irritation.
1	Pediculosis	Medicinal treatment.
1	Fracture of Humerous	No treatment.
2	Spavin	Counter irritation.
2	Ring-bone	" "
2	Infection of Sensitive Sole	Antiseptic treatment.
1	Sterility	Manual "
5	Influenza	Medicinal "
2	Hydrocele	Surgical "
15	Cough Epidemic	Medicinal "
1	Exostosis	Counter irritation.
1	Nasal Catarrh	Medicinal treatment.
1	Cystic Calculus	Operative "
2	Side-bone	Counter irritation.
1	Shoulder Lameness	" "
1	Amputation of Penis	Surgical operation.
3	Papilloma	" treatment.
2	Calk Wound	Antiseptic "
1	Sitfast	Surgical "
1	Capped Hock	Medicinal "
1	Castration	Surgical operation.
1	Abortion and Dystokia	Manual treatment.
1	Retained Placenta	Manual removal.
1	Injury to Leg	Surgical treatment.
1	Malignant Tumor (Sarcoma)	No treatment.
3	Conjunctivitis	Medicinal treatment.
1	Dystokia	Manual "
1	Wire Cut	Antiseptic "
1	Hygroma	Counter irritation.
1	Cryptorchid	Surgical operation.
2	Intestinal Parasites	Medicinal treatment.
	Demonstrations of Restraint	Work done by students.
	" of use of Stethescope	" "
	" of Post operative	" "
	" of Treatment of Wounds	" "
	" of Surgical Landmarks	" "

Small Animal Clinics—Dogs

Number of Animals	Nature of Case	Remarks
38	Ovariectomy	Surgical operation.
7	*Wounds and Injuries*	Antiseptic treatment.
6	Distemper	Medicinal "
5	Eczema	" "
5	Gastritis	" "
3	Conjunctivitis and Keratitis	" "
1	*Fracture of the Femur*	No treatment.
1	Mammary Tumor	Surgical removal.
2	Hemorrhoid	Medicinal treatment.
5	Mange Follicular	" "
3	" Sarcoptic	" "
2	*Fracture of Tibia*	Surgical "
1	Conjunctival Wound	Medicinal "
1	Deformity of Foot	No treatment.
3	Urticaria	Medicinal treatment.
2	Dystokia	Obstetric "
3	*Laryngitis*	Medicinal "
3	Abscess	Surgical "
4	Chorea	Medicinal "
3	Ascariasis	" "
1	Pleurisy	" "
3	Caudal *Amputation*	Surgical operation.
2	Constipation	Medicinal treatment.
1	Fractured Pelvis	No treatment.
1	Tumor of the Foot	Surgical removal.
2	Fistulous Tract	" treatment.
1	*Tumor of the Tail*	" removal.
1	Skin Infection	Medicinal treatment.
1	Lesions of Porcupine Quills	Surgical "
1	Amaurosis	No treatment.
3	Corneal Ulcer	Medicinal treatment.
1	*Hematoma*	Surgical "
4	Gastro-Intestinal Catarrh	Medicinal "
2	*Entropion*	*Surgical* "
6	Humanely Destroyed	
1	Fractured Pelvis	Post-mortem examination.
1	*Paraplegia*	" "

Cats

13	Ovariectomy	Surgical operation.
3	*Convulsions*	Medicinal treatment.
5	Wounds and Injuries	Antiseptic "
6	*Sarcoptic Mange*	*Medicinal* "
4	Castration	Surgical operation.
2	Hair Balls	Medicinal treatment.
1	*Skin Infection*	" "
3	Pyorrhœa	" "
1	Enteritis	" "
1	Chronic Bronchial Catarrh	" "
1	Injured Tail	" "
1	" *Foot*	*Antiseptic* "
1	Amputation of the Leg	Surgical operation.
1	Suppurative Fistula	" treatment.
2	Stomatitis	Medicinal "
1	Abortion	" "
2	*Constipation*	" "
1	Gastritis	" "
6	Humanely destroyed	

DISEASES OF CATTLE

R. A. McIntosh, M.D.V.

Eczema in Cattle

Eczema is an inflammatory skin disease affecting the papillary bodies and the superficial layer of the corium of the skin. It is associated with hyperemia, profuse exudation and itching. In the course of the inflammation nodules, vesicles and pustules develop diffusely in the inflamed and swollen areas, leading to a scaly excoriation of the integument and causing it to be moist and covered with crusts.

The most frequent causes of eczema are found in external agencies acting on the skin. Animals whose coats are neglected allowing dirt and epithelial debris to accumulate in the hair are frequently affected with it. Dampness also plays an important part for the continued affect of moisture on the skin is to soften the outer layer and, in conjunction with dirt and infection, gives rise to an inflammatory lesion. Mechanical influences such as rubbing, pressure, bites and continued irritation will cause it. Chemical substances, irritating medicinal applications and, in unpigmented skin, the direct rays of the sun may produce the disease. Gastro-intestinal catarrh and other digestive disturbances sometimes manifest themselves by cutaneous eruptions and disease. Some animals possess a diathesis for this form of disease as a result of eating certain kinds of food.

The symptoms in the early stages of the disease, if a considerable area of the skin is involved, consist of a slight fever, loss of appetite, dullness. The affected areas are sensitive, somewhat thickened and swollen, with the hair standing out straight. Moisture may be noticed and if the skin is unpigmented it will appear red and in some cases almost hemorrhagic. Itching and the formation of scales and crusts follows.

Of all domestic animals cattle are the least commonly affected, but the following cases which were observed on two investigational visits are cited as examples of the condition.

Case No. 1

This case was seen on a farm in the vicinity of Bronte, Ontario, in the county of Halton. The affected animal was one of a valuable herd of Jerseys which the owner keeps for the production of certified milk. The stabling quarters were kept clean, well lighted and comfortable. This was a four-year-old imported cow of a very nervous disposition. Late in February she gave birth to a normal healthy calf and was afterwards producing a fair quantity of milk. As a grain ration chopped oats, bran, shorts and oil cake were provided. For roughage, mangolds, corn silage and hay. The herdsman stated that some of the silage was a little mouldy and also that some of the hay was not very good.

Early in May a swelling was noticed at the umbilicus, the surface of which became raw and sore and from which a bloody serous exudate oozed. About this time the herd was turned out to pasture and this cow along with them. The diseased condition spread over the ventral surface of the abdomen. The udder and legs also became raw and sore, particularly those parts coming in

contact with the floor when the animal laid down. The local veterinarian had been consulted and other professional skill acquired but no diagnosis was made, neither was treatment recommended.

The examination of the case took place on June 16th and at this time the animal was being kept in a box stall isolated from other members of the herd. She was quite nervous when approached and had to be tied before she could be handled. She was in fair flesh and her appetite had remained good. Temperature 101.5°Fah. On examining the region affected, scabs, bloody exudate with a thickening of the skin over the entire ventral surface of the abdomen was noticed. Portions of the udder were affected and also the legs. It did not appear very sensitive to touch and the hair had fallen out of all the parts involved. The pre-crural lymph glands were noticeably enlarged. Feces passed were blood smeared but this feature had not been noticed before.

Swabs were taken from the bloodstained feces, from the belly wall and also a scab for bacteriological culture and examination. The other members of the herd which were out in the pasture were also examined but there was no evidence of any of them being affected with the condition.

A clinical diagnosis of eczema was made. Bacteriological culture and examination of swabs and material taken from the lesions did not reveal anything specific or exceptional. The report mentioned the Staphylococcus albus and aureus such as would be expected from extraneous contamination.

In the treatment of the case it was recommended that the diet be adjusted by providing green food, bran and other laxative agents. Medicinally a cathartic dose of epsom salts was given to be followed by the daily administration of sodium hyposulphite.

Topical applications of commercial olive oil to soften and loosen up the scabs and scurf. After twenty-four hours the parts affected were to be washed off with soap and clean warm water to which sodium bicarbonate was added. White lotion was then to be applied daily.

Case No. 2

In this instance the disease occurred in a pure-bred Guernsey heifer on a farm near Port Dover, Ontario. At the time the investigation was made the animal had been affected for about a month. No definite attributable cause could be ascertained, but it was felt that it was possibly due to some dietetic error or digestive disturbance. The appetite was good and the temperature normal. Itchiness was quite marked and the skin all over the body was affected, although most noticeable along the lateral aspects of the neck and shoulders. In this case the formation of pustular elevations was quite conspicuous and they had reached the stage where the top of them had formed a dry, hard scab. These could be scraped off, and underneath a raw sore at various stages of healing was seen. No other member of the herd was affected. Swabs were taken for bacteriological examination and as in the preceding case the findings were negative. The treatment and handling of the case recommended was similar to that mentioned for case No. 1. Subsequent reports of these cases revealed that they had both recovered.

OSTEOMALACIA IN CATTLE

During the past year a number of practising veterinarians in the province have reported a condition of a rheumatic character affecting more particularly milk cows. In describing the disease mention is usually made that these animals at first have a depraved appetite and will lick at and eat foreign material, such as sticks, bones, and decomposing food stuffs. They gradually lose flesh, their appetite grows more capricious, they stiffen up, become lame and reluctant about moving and in some instances go down and are unable to get up without assistance. By further inquiry it was learned that the districts in which the disease is most prevalent, have for the greater part sandy soils. Such soils are frequently lacking in elements required for the growth of bone and the process of metabolism in the body as a whole. Animals pastured on forage grown on soil of this character or fed on food stuffs produced on it will more frequently manifest diseases in which there is an interference with metabolism than those which are fed on food produced from soil in which there is a greater percentage of calcium and phosphorus. The history of these cases, together with the symptoms described, indicates a disease in which there is a nutritional deficiency such as occurs in Osteomalacia.

The term Osteomalacia means bone softening. It is a disease arising from general nutritional disturbances, which causes an increased absorption of lime salts from the bones and substitution of the liquified bone tissue by osteoid tissue, from which softening, sometimes crumbling, and occasionally fractures, may occur.

This disease is most frequently seen in cattle, especially milk cows, although it does occur in other animals. It is more prevalent in districts and regions with unfavourable soil conditions and more particularly in dry years. In some countries with the occurrence of a dry year, it assumes enzootic proportions and is the cause of considerable loss in cattle.

Etiology. Osteomalacia is caused by calcium and phosphoric acid deficiency in the body. This statement is supported by the occurrence of the disease in regions where it is known that these elements are lacking in the soil. Plants and grasses growing on such soils are poor in minerals especially in dry years when the salts in the upper layers of the earth are not properly dissolved and in that way are not available for plant assimilation. Furthermore, a calcium and phosphorus deficiency may occur as a result of improper methods of feeding. If animals are fed continuously with feeds which naturally contain but little of these elements there is a possibility of the disease occuring in them. This is especially true in pregnant cows, for during this period they are required to supply an extraordinary amount of these nutritional elements for the development and growth of the fetus. Long continued digestive disturbances may give rise to a similar form of disease but as a rule can be successfully differentiated. Some writers have attributed trophoneurotic disturbances as having a causal relation to this disease. Others have investigated it with the belief that the disease had an infectious origin. It is more likely that these are secondary phenomena rather than being the primary causes, for nutritional deficiency lowers vital resistance and increases susceptibility to other forms of disease.

Pathogenesis and Anatomical Changes. The calcium content of boney structures is largely responsible for their solidity. When calcium is wanting in the body a resorption of that element from the bones takes place. Larger amounts of calcium are required by animals during the growing periods of their life, during

pregnancy and during lactation and it is at these time the disease is most commonly manifested. The need of this element is felt by the body and leads to the depravity of appetite seen in the disease. Abstraction of calcium from the bones takes place from within outwards, that is, from the marrow canals to the surface. Decrease in the solidity of the bones goes hand in hand with the increase of irritation from body movements. The affected animal is reluctant about moving and manifests lameness. As the disease progresses those areas of the bones where tendonous, ligament and muscular attachments take place, tend to enlarge by the formation of limeless bone tissue resulting in the condition known as osteporosis. Fractures occur easily and in some instances tendonous attachments are ruptured. Deformities occur most frequently in the pelvic bones and the spine. The affected animal is greatly emaciated not only because her appetite is poor, but also for the reason that calcium plays an important part in metabolism. The articular cartilages lose their substance, joints become enlarged and rattling sounds are heard when the animal moves.

Symptoms. In cattle the first noticeable manifestation is usually in the form of a digestive disturbance with depravity of the appetite. At first the animal tends to lick at the manger or the walls, later they may gnaw at them and preferably objects which contain lime, such as mortar. As the disease progresses they will chew at rotten wood, eat bones and apparently relish straw or roughage that has been soiled with urine and feces. Their appetite for their regular diet remains good for a time, the depravity only being noticed between meals, but as the disease advances it becomes capricious, they eat reluctantly and smaller amounts. Ultimately they may refuse good fodder entirely and the digestive disturbance is marked. Other prodromal symptoms are convulsions in which the animal appears dazed and staggers.

During this time changes in the bones have been occurring as a result of resorption of their calcium. The bone disease gives them pain, they lie down a great deal, are reluctant about rising and do not move except when forced to. Their movements are stiff and lameness may be quite marked much like rheumatism. When walking a peculiar cracking sound is heard at the joints probably due to the loosening of the articular cartilages. The bones seem sensitive to manipulation and quite often inflammatory swellings take place around their epiphyses. Fractures occur easily with deformities resulting.

The emaciation of the animal gradually increases. The muscles become flabby and ultimately paralysis may occur so that the animal is no longer able to rise. As a rule the temperature remains normal unless some complication occurs which gives rise to fever. The secretion of milk steadily decreases and finally ceases.

Osteomalacia always takes a chronic course and in the initial stages may pass unobserved. In some instances a change in the diet may arrest its development. Gestation, parturition and lactation are predisposing factors and aggravate or hasten the occurrence of the disease.

Treatment. If the condition has not advanced too far a measure of success may be obtained by the institution of proper treatment. On the other hand, if the animal is greatly emaciated, reluctant about moving and manifesting other symptoms of bone envolvment treatment is not so likely to be attended with success. If the disease makes its appearance while the animal is on pasture, it is advisable to change the pasturage and if possible supply leguminous forage for it is rich in calcium, phosphorus, protein and chlorides. If new pasturage is not available the diet may be augmented by supplying a grain ration containing cotton seed meal, bran, oat chop, and possibly barley chop. To this may be

added a mixture of steamed bone meal 2 parts, and salt 1 part. Prepared chalk may be given, also phosphoric acid. Calcium phosphate is useful. In those cases where the appetite is poor digestive tonics and ferments are indicated and should be used. If cows are milking when affected it is advisable to dry them up. Other agents recommended are calcium chlorate and preparations of iron and phosphorus together.

Preventative measures consist chiefly of maintaining a suitable and properly balanced ration. On farms or in localities where it is prevalent the use of a suitable fertilizer for these soils is a certain measure of prevention. A soil analysis would greatly assist in choosing the proper fertilizer. Where no attempt is made to correct it through soil fertilization the addition of calcium and phosphorus to the feed is useful. Bone meal, wood ashes, prepared chalk may be used for this purpose regularly and are comparatively inexpensive.

Actinomycosis in an Unusual Location

Clinic Case No. 127

The subject of this clinical report was a pure-bred shorthorn bull.

History.—During August and September of 1925 this animal manifested symptoms of digestive derangement. Bloating and suspended rumination were the most notable symptoms. He was placed under treatment and the diet restricted to food that did not lend itself to fermentation and bloat. Digestive tonics and bowel stimulants were used over a considerable length of time. A slight measure of relief was obtained, but no permanent cure could be effected. As time passed by his appetite grew capricious, he was continually typanitic and was seldom observed ruminating.

In November the animal was brought to the hospital for observation and intensive treatment. The stomach tube was passed and on each occasion food was vomited. This occurred repeatedly. It seemed that the moment the tube entered the gastric extremity of the esophagus the act of vomition was stimulated and large quantities of food would be thrown up even when the tube was in the gullet. After an experience of this kind he would be better for a few days but in each instance it only gave temporary relief.

A tentative diagnosis of Chronic Traumatic Reticulitis was made. A number of different methods of treatment were applied without any success. As the patient was commencing to lose flesh and look unthrifty, it was decided to slaughter him subject to inspection.

Post-mortem Examination.—All of the visceral organs of both the thoracic and abdominal cavities were found normal except the reticulum and diaphragm. Lying between these two structures was a large tumor-like mass weighing about ten pounds. A fistulous tract leading from the growth into the reticulum was noticed. At the point in the reticulum where the tract opened the mucous membrane had been replaced by a considerable area of granulomatous tissue characteristic of Actinomycosis. The tumor on section showed numerous foci of pus and possessed the appearance of actinomycotic lesions.

Samples of the pus and pieces of the tumor were taken for microscopic examination. The pus contained large numbers of the Ray Fungus and stained sections of the tumor also revealed its presence.

Remarks.—This actinomycotic lesion was probably the result of invasion of these tissues by the Ray Fungus following a puncture of the reticular wall by a foreign body.

Urethral Obstruction by Calculi

Clinic Case No. 271

History.—This case was one which occurred in an Angus steer about a year old. He was being kept along with two others for experimental feeding purposes. They were allowed to run loose in a large roomy stall and every day turned out for an hour or two in a small yard to exercise. The diet consisted of a grain ration with silage, roots and alfalfa hay for roughage. When this animal first took sick the attendant noticed he was not feeding.

Examination.—He was in good flesh and quite thrifty. The mucous membranes of the eyes and nose were congested. A little saliva was drooling from the mouth. Pain was manifested by switching of the tail, kicking at the belly, snorting. At intervals he would throw himself down only to rise again in a short time and repeat the switching and kicking. By manipulation of the sheath and the preputial tuft of hairs calcareous material was found, indicating the possibility of urethral obstruction. Accordingly a rectal examination was made to palpate the bladder and it was found to be enormously distended with urine.

Diagnosis.—Urethral obstruction by Calculi.

Distension of the bladder, due to urethral obstruction by calculus.

The animal being in good flesh immediate slaughter was advised. This was done and the bladder and penis obtained for demonstration purposes. The urine contained in the bladder was measured and amounted to approximately a gallon. Numerous small calculi were found in the bladder. On sectioning the urethral canal down through the penis the obstruction was located at the sigmoid flexure of the penis. The calculus causing the obstruction was about the size of a large pea and a considerable number of smaller ones were lodged immediately above it.

Urethral Calculi in a Jersey Bull

Clinic Case No. 441

History.—In this instance a valuable pure-bred Jersey bull was affected. He was kept for breeding purposes. On one or two previous occasions difficulty in urinating was noticed, but each attack had passed off. On this occasion, however, the symptoms persisted and the condition became quite acute. Veterinary assistance was obtained and a diagnosis of Urethral obstruction made.

As the owners were very desirous of saving the animal for breeding purposes they immediately communicated with the college and requested an operation to try and relieve the condition. The patient was brought to the hospital and by careful manipulation the obstruction was located in the sigmoid flexure of the penis. He was then prepared for operation.

Restraint.—Chloral Hydrate was administered to produce hypnosis. The patient was then secured on the operating table and a local anaesthetic injected at the site of the incision.

Technique.—Operative site cleansed and rendered aseptic. Incision on the median line just above the base of the scrotum posterior to the sigmoid flexure of the penis. The loose areolar tissue under the skin was broken down by blunt dissection and the loop of the penis drawn back through the cutaneous incision exposing that part of it in which the obstruction was lodged. A short incision was then made in the penis and urethra directly over the calculi which were removed. Urine flowed through incision in sufficient amounts to relieve the distension of the bladder. The penis was then replaced and the cutaneous wound partly sutured.

Reproductive Diseases

Clinic Case No. 424

In this clinic two pure bred Holstein heifers were presented for examination These heifers were triplets, the other member of the trio being a male animal. The owner had sold the bull for breeding purposes but kept the heifers with the intention of breeding them when they became sexually mature. At the age when heifers usually come in season these ones failed to manifest it. The owner then decided to have them examined to determine the cause of this.

Examination.—One of the heifers looked quite natural and effeminate, the other was coarser in type and showed a somewhat steer-like appearance about the head and neck. The external genitals were apparently normal, but the vaginal canal was abnormally short in both cases. No cervix could be found. By rectal manipulation no uterus, cornua or ovaries could be located. Only rudimentary structures were found in the place where the reproductive organs normally lie.

Diagnosis.—Neuters or Free-martins.

Remarks.—This peculiarity of the bovine species is remarkable. When both sexes are represented in a twin or triplet birth in the vast majority of cases the females are permanently sterile. The female genital organs develop up to a certain stage and then their growth is arrested. There is no indication of hermaphrodism. It is simply an arrest in the development of their reproductive organs. On the other hand the males are usually potent and capable of reproduction.

FREE MARTINS.
Notice the coarse, steer-like appearance of the lower individual.

STERILITY DUE TO TRAUMATIC CERVICITIS

Clinic Case No. 104

History.—A pure-bred Shorthorn heifer which had been coming in season regularly and had been bred regularly without conceiving was brought in for examination and diagnosis. On enquiring into the history of this case it was learned that the owner had used a pointed stick to try and open the cervix. He had also forced his hand into the vaginal passage.

Examination.—The mucous membrane of the vagina showed evidence of chronic inflammation by an accumulation of exudate and also the presence of nodules and in one place a slight stricture. With the use of a glass vaginal speculum and a flashlight it was observed that the cervix had been injured on one side of the opening and that it was somewhat swollen and inflamed.

Treatment consisted of warm palliative vaginal douches and the application of Lugol's solution of iodine to the cervix. This treatment was repeated twice a week. In applying the iodine to the cervix the glass speculum was used to prevent it irritating the vaginal walls. When the heifer came in season a small catheter was readily passed through the cervical canal, after which she was taken home and bred.

Sterility Due to Cervicitis as a Result of Infection

Clinic Case No. 204

History.—This cow was a pure-bred Shorthorn of the dual purpose type. She had been a regular breeder up till the conclusion of her last pregnancy period, August 3rd, 1925. Since that time, in spite of the fact that she had been bred repeatedly and with different bulls, she had failed to conceive.

Examination.—The animal was in good flesh and apparently healthy. In examining the genital tract the vagina was found to contain mucous and pus. The cervix was inflamed, swollen, sensitive and bled easily on manipulation. The other reproductive organs were apparently normal.

Treatment was applied twice a week and consisted of vaginal douches and the use of Protargol sticks placed in the cervical canal at the conclusion of each treatment. At the end of three weeks much improvement could be seen and she was returned to her owner.

Teat Troubles in Cows

There are a number of conditions which may affect the teats of cows that are the cause of considerable annoyance and inconvenience in milking. Other conditions which prevent the flow of milk from the teat, thereby causing the loss of the quarter. The following are reports of cases of this character:

Stricture of the Orifice of the Teat

Clinic Case No. 78

This subject was a Holstein cow which had proven to be a splendid milker but, because of strictures in the orifices of the two back teats, great difficulty was experienced in milking her. She was brought to the college for the purpose of relieving the condition. In performing this operation it is desirable to have a quantity of milk left in the udder and in order to perform it successfully the animal should be properly restrained.

For this purpose the patient was given chloral hydrate with the stomach tube to partially anaesthetize her. She was then secured on the operating table. The udder and the teats were thoroughly washed off and rendered aseptic. The teat was then grasped and rendered tense by filling it with milk. A fine-bladed bistoury was inserted in through the orifice of the teat into the teat canal. The cutting edge was then forced through the tissues around the orifice down to the skin. Two or three cuts were made in this manner in different

directions so as to insure a free opening. Care is taken not to cut through the skin, for there is danger of having a leaking teat if this occurs. The after-care consists of frequent milkings to maintain a free opening during the healing process, which usually takes about a week.

Teat Tumor

Clinic Case No. 141

The subject of this clinic was a dual purpose Shorthorn cow which had calved recently. When milked it was discovered that none of the secretion could be drawn from one of the teats. By careful manipulation a small tumorous growth could be detected in the upper third of the teat canal. Milk could be pressed down to the enlargement but would not flow from the orifice of the teat for the tumor completely occluded the canal. To relieve the condition the animal was secured on the operating table and a local anaesthetic injected around the tumor. The end of the teat was cleansed and rendered aseptic. The teat was grasped and distended with milk. A fine nicking knife was then inserted up through the tumor and it was slit in three or four directions to the wall of the teat canal. The after-treatment consisted of frequent milkings to prevent closure during the healing process.

Supernumerary Teats

Clinic Case No. 29

This was a Jersey heifer one year old which had developed two small rudimentary teats on the back quarters of the udder.

The animal was confined in a stanchion and a local anaesthetic injected at the base of the teats to be removed. Each teat to be amputated was thoroughly cleaned and painted with tincture of iodine. The end of the teat was grasped and a little traction applied. It was then cut straight off close to the udder and an antiseptic dressing used on the wound. This operation may be performed at any time, but it is advisable to do it before the udder becomes functionally active, while the animal is a heifer, or when the adult cow is dry. Supernumerary teats are a source of considerable annoyance when milking and if they secrete milk may become infected and give rise to mammitis. If they attain much development they are unsightly appendages to what may otherwise be a well-formed udder. The amputation of them is a simple and safe operation when a reasonable amount of care is used in performing it.

Lacteal Fistula in the Teat

Clinic Case No. 407

This case was in a good milk-producing Holstein cow. It was learned that she had injured the teat on barbed wire. At the time the laceration took place the cow was almost due to freshen and milk was being secreted in the udder, which was constantly leaking from the teat through the wound. This condition is known as Milk or Lacteal Fistula, and to relieve it an operation was performed. The cow was cast in a recumbent position and all movement controlled by proper tying. The teat was thoroughly washed and cleansed off with antiseptics. At the site of the fistula an elliptical incision was made around it right

down to the teat canal. The margins of the wound were then drawn together with figure 8 sutures and a protective dressing of collodion applied. A teat tube was left in the teat to drain off the milk and prevent tension.

Calf Pneumonia Associated with Gastro Intestinal Catarrh

Clinic Case No. 389

History.—This subject was a valuable pure-bred Jersey bull calf which, along with a number of other calves, had been affected by an ailment apparently somewhat contagious in character. Some of the diseased animals had died and this one was very sick and as the condition lingered on was gradually growing weaker and thinner. The owner being desirous of determining the nature of the disease, shipped the calf to the college for examination and observation on July 21st, 1926.

Examination.—On arrival the calf looked very unthrifty and weak and remained in the recumbent position most of the time. The tail and buttocks were smeared over and stained with greyish coloured feces. A muco-purulent exudate was being discharged from the nostrils in considerable quantities. A hacking cough was frequently heard and the breathing was quite laboured. Temperature 104° Fah. It would drink a little milk twice a day, but apart from that its appetite was very poor at first. The surface and the extremities of the body felt cold, indicating a weak circulation.

Diagnosis.—Broncho-pneumonia associated with gastro-intestinal catarrh. In this connection swabs were taken high up in the nostrils for bacteriological examination and culture. Stained smears of this material showed almost a pure culture of the Hemorrhagic Septicemia organism. The cultural characteristics of this organism were also demonstrated when grown.

During the period of time the calf was under treatment the temperature was recorded daily.

Date	Temperature	Date	Temperature
July 21st	104 Fah.	Aug. 4th	102.5 Fah.
" 22nd	103.5 "	" 5th	101.5 "
" 23rd	103 "	" 6th	101.5 "
" 24th	105 "	" 7th	101.6 "
" 26th	104.5 "	" 8th	101.2 "
" 27th	103.2 "	" 10th	101.2 "
" 28th	103 "	" 11th	101.1 "
" 29th	102.5 "		
" 30th	102.5 "	From this date until the end of August the temperature remained normal.	
" 31st	103.6 "		
Aug. 1st	102.6 "		
" 3rd	103 "		

Treatment.—Comfortable quarters which were well lighted, dry and kept clean were provided. For its diet milk was provided. Bran, crushed oats and freshly cut alfalfa were also available any time the calf had the inclination to eat. When it was known that the Hemorrhagic Septicemia organism was so prevalent in the discharge a dose of the bacterin was given. It was felt that the respiratory condition was most serious and accordingly a bronchial mixture composed of ammon. chloride, liq. camphor cpd. and tolu, combined with

composed of liquid taka-diastase and sodium salicylate was given. Taka-diastase is a digestive ferment acting chiefly on the starches converting them to sugar. Sodium salicylate is an intestinal antiseptic. With the institution of this treatment marked improvement took place at once. The feces became normal in consistency and colour. The temperature dropped to normal in a few days and remained there. The animal brightened up and commenced to eat. In a week's time milk was added to the barley water in equal proportion. With the correction of the digestive condition and the restoration of the animal's vitality the bronchial ailment gradually disappeared after which it was allowed to range on alfalfa pasturage.

Remarks.—White Scours and Broncho-pneumonia are rather common ailments in calves and the two conditions are frequently associated. In outbreaks of the disease where both conditions are evident it appears to be most important to correct the digestive derangement as early as possible.

DISEASES OF PIGS

R. A. McIntosh, M.D.V.

Rheumatism in Pigs

Clinic Case No. 229

History and Symptoms.—In this instance six pigs were affected, four Yorkshires and two Tamworths. They were about four months old. While nursing, their mothers had done well and continued to be thrifty after weaning. Quite suddenly they developed a severe form of sickness which crippled them up badly. For a few days they were off their feed and on examination it was found they were somewhat fevered, discharging mucous from the eyes and coughing a little. If forced to get up they would squeal with pain and they were very reluctant about moving. The trunk of the body was held somewhat fixed and the back arched. When driven to the feed trough they would eat and drink.

Treatment.—They were placed in a clean, comfortable, well ventilated and heated pen. The diet was restricted to skim milk, shorts, and a little oat chop. Sodium salicylate in two-drachm doses was added to the food. In a short time marked improvement was seen in four of them and they continued to improve until they apparently were quite recovered. The other two, however, never showed any signs of improvement and remained much as they were at first in spite of the fact that they were given special care and attention for a period of three months.

Remarks.—In these cases the rheumatic condition followed an acute febrile infection much like the so-called Hog Flu. In other cases too rich and heavy a diet after weaning is a predisposing factor. Pigs kept in dark, damp, and poorly ventilated quarters are also frequently affected with it. Once it becomes well established little can be done in the way of curing the disease, but knowing the circumstances under which it usually occurs, measures of prevention can be readily applied. These consist of providing light, roomy, well ventilated quarters which are kept clean and dry. After weaning the young pigs should

symptoms mention was made that the pigs coughed and seemed to breath faster. Their appetite remained good and they kept in fair flesh. A day or two prior to their death they would stagger when walking and ultimately become more or less paralyzed and unable to move.

Autopsy.—General Appearance.—Carcass in fair condition.

Abdominal Viscera.—Slight evidence of inflamation in the intestines and associated lymph glands. The liver, spleen, kidneys and other organs were apparently normal.

Thoracic Viscera.—Both lungs showed large areas of inflammation. In the bronchial tubes a mucous exudate tinged with blood was present in considerable quantities. By cutting out through the smaller bronchioles and close examination, large numbers of fine thread-like worms were found. These parasites extended right out to the apices of the lobes.

Diagnosis.—Verminous broncho-pneumonia.

Remarks.—The staggering gait and paralytic condition seen in these pigs prior to death was probably due to the absorption of toxic material from the seat of the disease.

Actinomycosis of the Udder in a Sow.

Clinic Case No. 474

History.—A pure-bred Berkshire sow developed a mammitis in one of the glands while pregnant. The area involved became tumefied, painful and swollen. Local applications were used for a few days. At the end of that time a fluctuating spot in the centre of the lesion indicated the presence of pus. It was lanced and irrigated. A sample of the pus was taken for microscopic examination and culture. The swelling and sensitiveness was reduced through the operation somewhat, but as time passed other areas softened and had to be lanced or else ruptured themselves. Owing to the fact that the animal was close to her farrowing time, it was decided to defer any further treatment until after the pigs were weaned. A few months later she was returned to the college for operation. In the meantime the tumorous growth had developed considerable and was discharging pus from several openings.

Restraint.—One ounce of chloral hydrate in solution was given per rectum to partially narcotize the patient. Under its influence she was readily handled. She was then placed on the operating table and completely anaesthetized with an A.C.E. mixture.

Technique of the Operation.—The operative site was thoroughly cleansed and rendered aseptic. An eliptical incision was made around the base of the tumour after which it was carefully dissected out. In removing it considerable hemorrhage occurred but whenever a vessel was encountered it was caught up with hemostats until the removal of the tumour was complete. Sutures were applied, drawing the margins of the wound to their proper relations. Iodine dressing over all. Potassium iodide was given daily to supplement the operative treatment. Specimens of the tissue and samples of the pus were taken for section and microscopic examination mears of the pus contained large numbers of the Ray Fungus. The organism was also found in sections of the tissue specimens.

DISEASES OF SHEEP

R. A. McIntosh, M.D.V.

Parasitism in Sheep.

Clinic Case No. 460

In this instance four pure-bred Oxford lambs were submitted to the clinic for examination and observation. They were taken from a flock of 150 in which latterly five of the lambs had died.

History.—The owner of these pure-bred Oxfords had been in the habit of raising a large number of lambs each year which were usually disposed of for breeding purposes. This year it was noticed that some of the lambs were not as thrifty as in former years. The unthrifty animals were in many cases affected with diarrhea. Some of them became quite thin and a few died. The owner noticed when going around in the sheep pens white particles in the manure which he thought were worms. Accordingly these four sheep were brought in to determine the nature of the disease.

Examination and Symptoms.—One of these lambs was in fairly good shape but had been noticed passing white particles in its manure. Two of them were quite stunted in their growth, in poor flesh, their wool harsh and dry, and they also manifested symptoms of diarrhea. Slight edematous swellings were noticed along the sternum and abdominal wall of one of these. The fourth lamb was in better shape than the two smaller ones but not as thrifty as the first mentioned one. They all manifested symptoms of diarrhea, the wool around the hind parts being stained and matted together with feces. Segments of tapeworm could be seen in the feces. When the wool was parted quite a number of ticks could be seen and also some lice. Samples of feces were obtained from each sheep for microscopic examination, and in each case parasitic eggs of the stomach worm were noticed. Hook worm eggs and whip worm eggs were also found. Another very large egg, which was capable of changing its shape while being observed but which could not be identified, was noticed. The owner was instructed as to the proper method of handling the flock at home. The four which were brought to the college were placed under treatment and used for demonstration purposes in diagnosis and handling of such conditions.

Remarks.—In this outbreak of disease there was positive evidence that these sheep were infested with five different forms of parasites in the gastro-intestinal tract. They were also affected with two forms of external or skin parasites. This feature of parasitism very often obtains in sheep, and bears out the fact that conditions and surroundings, which favour the propagation of one form of parasite, are very often favourable to the growth and development of other forms of parasites. It was learned that these sheep had been pastured on land that had been used repeatedly year after year for sheep grazing. Also that old breeding ewes were kept from year to year for breeding purposes and, while this may not be a fault in itself if care is taken to rid them of parasites, at the same time there is an element of danger in it for quite often the old sheep will harbour a number of parasites with impunity but are a source of danger for the lambs may become heavily infested from grazing on contaminated pastures. Overstocking was admitted in this instance as well, and it is a mistake to keep more sheep than can be properly attended to, for it favours the spread and general infestation of the flock if any of the older sheep are harbouring parasites.

Treatment.—In each case the udders were freely lanced, permitting the pus and the exudate to escape, and in twenty-four hours a marked improvement was noticed in the animals. They commenced to eat and would walk about in the pasture. Every few days portions of the gland, which had become necrotic, were removed and the cavity irrigated with an antiseptic solution. This was continued until healing took place.

Remarks.—In controlling this condition care should be taken to isolate affected members of the herd. When milking out the quarters it should not be milked on the floors, fearing the spread of the infection by contamination of the bedding. The shelters should be kept clean, dry and free from any obstacles by which bruising or injuring of the udder might occur. As soon as the ewes lamb, their udders should be examined to determine as to whether they are normal or not, and to see that the milk secretion is being drawn off. If there is any indication of hardness or pain, measures should be taken at once to combat inflammation before the disease becomes well established.

Dystokia in Ewes

Clinic Case No. 228

All successful breeders of sheep are fully aware of the fact that ewes require special attention and care at lambing time and, while this feature of sheep husbandry is generally recognized, it should be remembered that in order to insure the safe delivery of a good crop of lambs the proper care and attention of the ewe during the pregnancy period as a whole is equally important. Difficult parturition in ewes is most commonly seen in flocks which are housed too closely during the winter months and which are fed too heavily and kept too fat. Kindred troubles such as protrusion of the vagina before lambing and prolapse of the uterus after lambing are also seen in sheep kept in this manner. Dystokia also occurs as a result of malpresentation and malformation of the fetus. The majority of cases which have been handled at the college have occurred in sheep which have been highly fed and in which the cervical canal fails to dilate at the time of birth. One breeder in the vicinity of Guelph has, for the last four years, brought in sheep each spring affected in this way. He keeps his sheep highly fitted for show purposes and has repeatedly experienced this trouble with them.

A pure-bred Suffolk ewe was the subject of this clinic. She was manifesting signs of parturition by uneasiness, expulsive efforts, a full udder from which milk was dripping. By manipulation it was determined that the cervix had failed to dilate.

Handling of the Case.—The external genitals were cleansed, the hand introduced into the vagina and the cervix carefully dilated with the fingers and an instrument dilator. After a short time triplet lambs were taken away (all living). Pituitrin in 2 c.c. doses was given to strengthen the ewe and cause contraction of the uterus.

Remarks.—In the care of the pregnant ewe there are three features most essential. The diet provided should be of a whole some character, nutritious and sufficiently varied to provide all of the elements necessary for the maintenance of her health and the development of the fetus. For this purpose a light grain ration composed of oats, bran, and a little flax seed meal is suitable. For roughage, alfalfa or clover hay together with coarser food may be used. Roots are also of value. A half a teaspoonful of the iodide of potassium for each sheep once a month during pregnancy is useful to prevent goitre in the lambs. Salt

should be available at all times. Exercise is a very important item in the care of the pregnant ewe. It is essential to their physical well being. The ewe should be allowed out every day. It is not only essential for her but also assists in the development of a strong, thrifty and robust lamb, and the ewe is less likely to have trouble at the lambing time. Nearing the time of parturition the ewes should be fed smaller amounts and on food of a more laxative character. Pens should be kept clean, comfortable and warm when lambing occurs.

Tetanus in a Lamb

Clinic Case No. 363

History and Symptoms.—The owner of this lamb had noticed that it had been ailing a little for a few days, and in the morning on which he brought it in it was down and unable to get up. It had been castrated and docked about three weeks previous. When examined it was found that all of the muscles in the body were rigid, the mouth could not be opened, the limbs were held stiffly and required considerable force to flex them, and the head was drawn back. An examination of the scrotum revealed a sloughing wound where it had been castrated.

Diagnosis.—Tetanus. By the per rectal administration of chloral hydrate in solution, muscular relaxation took place in about fifteen minutes. This could be maintained by continued use of the drug but as soon as the effect wore off the rigidity of the muscles returned. The animal died the following day.

Remarks.—Care should be taken when castrating lambs to disinfect the scrotum and subsequently it should be examined occasionally to see that it is healing normally.

SMALL ANIMAL DISEASES

During the instructional period of each college year, one afternoon of each week is devoted to small animal clinics and a considerable number of cases are handled. These are quite varied, including surgical cases, medicinal cases, parasitic diseases, and many others. The following are examples:

Entropion in a Dog

Clinic Case No. 461

History and Symptoms.—This was a large, black and tan hound used for hunting purposes. The owner stated that ever since he was a puppy the eyes had been discharging and that it was necessary to keep doctoring them all the time. Lachrymation was evident and a slight corneal opacity could be seen in one eye. On examination it was determined that both of the lower eyelids were turned in, being a continual source of irritation.

Operation.—Resection of a portion of the skin on the lower eyelid.

The animal was restrained and the operative site anaesthetized with a two per cent. procaine solution. An incision was made parallel with the margin of the lower eyelid through the skin only. Another incision was made crescent shaped, the ends of which met with the ends of the first incision. All of the skin inside of the incised area was carefully dissected out and the margins of the

wound sutured together with chromic catgut. These sutures drew the margin of the eyelid away from the eye ball. A collodion and iodiform dressing was applied.

Hair Balls in a Cat

Clinic Case No. 21

The subject was a beautiful yellow Persian cat. The owner stated that it had not been doing well lately, would occasionally take convulsions and seemed to be constipated. When brought to the hospital it was in a convulsion.

Treatment.—A 15 gr. triple bromide tablet was given which relieved the pain so that the patient could be examined. By careful manipulation of the abdomen it could be determined that the bowels contained a considerable amount of lumpy material. Accordingly it was given an oleaginous cathartic of castor oil and mineral oil, equal parts. The following morning an examination of the feces revealed the presence of hairballs, and by further manipulation of the bowels more of them could be felt. After that the patient was given daily doses of mineral oil and the bowels manipulated through the abdominal wall as well. It took one week of this treatment before all the hair had been removed.

Remarks.— Digital manipulation and mineral oil administration seemed to be the most suitable treatment for this case. Other cathartics would have been too depleting and irritating. Long-haired cats are prone to this condition, a fact which should be borne in mind when handling them.

Fractured Metacarpus in a Black Fox

Clinic Case No. 481

History.—In this instance a valuable female black fox was injured. This animal was exceedingly timid and the day previous she had been frightened in her pen. In her excitement she had run up the woven wire of her pen in which her foot got caught, and in trying to extricate it broke her leg in the metacarpal region, just below the knee. When examined it was found that all four metacarpal bones were fractured, and in one place had almost punctured the skin.

Handling the Case.—It was held and restrained by muzzling the jaws. Light pasteboard splints were made and fitted to the leg well up over the carpal joint. A bandage was put on, to which glue was applied as it was unrolled. This makes a light, firm cast. When the glue dries it hardens. A little powdered aloes was sprinkled on the outside coating of glue to prevent chewing at it.

DEPARTMENT OF PHYSIOLOGY

The course in physiology is given to second and third-year students and embraces the study of life and living things, more particularly the functions and actions of living beings. The course of instruction is arranged in two parts, consisting of general physiology and special physiology. The study is commenced by introductory lectures bearing on the functions of the cells and tissues in general, followed by a description of the functions and activities of the special organs and various tissues of the higher mammals. The subject is a very important one and emphasis is placed on the comparative physiology of the domestic animals in its relationship to veterinary science, and of the ductless glands to the well-being of farm animals.

INTERSEXUALITY IN MAMMALS

L. STEVENSON, B.V.Sc., M.S.

Intersexuality is an abnormal condition in which more or less rudimentary characters of both sexes are combined in the same individual. Animals having the peculiarities designated by the term intersexuality may be grouped in two classes, hermaphrodites and pseudo-hermaphrodites.

True hermaphroditism is a very rare condition in mammals, it may be bi-lateral, unilateral or lateral. In the bi-lateral form there are ovaries and testes on both sides; in the unliateral form, an ovary and a testis on one side only; and in the lateral form, an ovary on one side and a testis on the other. In cases of this kind the glands are far from normal histologically and usually without the ability to function in the procreative sense. Into this class are placed all individuals in which are combined not only somatic characters but also generative organs of both sexes. The accessory genital organs may show any degree of associated abnormality.

Pseudo-hermaphroditism is a relatively common condition in mammals, and into this class may be placed all individuals in which are combined not only the somatic characters of both sexes but also the generative gland of one sex. Pseudo-hermaphroditism may be masculine or feminine according to the type of gonad present. The external genital organs are undifferentiated or show characteristics of the sex opposite to that of the gonad. This is also generally true of the tertiary sexual characters, such as voice, fat development, hair development and character. The gonads are usually without function, however, fertile pseudo-hermaphrodites have been known. All transitory changes between an ovarian rudiment and a testicle may be found in the pseudo-hermaphrodite. The variations in the accessory generative organs are equally great.

The case of the freemartin is of interest. When the twins of cattle are of different sexes, the male one is normal and the other one is abnormal in ninety-five per cent. of the cases investigated. The external genital organs of the freemartin are generally seen to be well developed. However, in some cases it has been noted that the clitoris has hypertrophied into a penis-like organ. The internal genital organs are abnormal to a varied extent. The ovaries are generally rudimentary and in some cases resemble rudimentary testicles. The uterus is small, thin and as a rule very much underdeveloped. In body conformation the freemartin resembles the "castrate." When both twins in cattle are of one sex they are normal. The question, why is the "female" twin generally abnormal has been answered by the results of investigation by various workers who found evidence on anatomical examination of foetuses; that in opposite-sexed twins, the "female" foetus had abnormal internal sex organs, where there was a fusion of the two chorions and an anastomosis between the blood vessels. On the other hand, the female twin was found to be normal when there was no anastomosis of the blood vessels between the male and female foetuses. With direct communication established by anastomosis of the blood vessels carrying the circulating fluid between the two individuals, the female one undergoes masculinization under the influence of the male sex hormone, which by virtue of this peculiarity of circulation is permitted to invade the blood of the female foetus, bringing about a supression of the hormonic influence in the female direction; and substituting therefor a stimulus for the growth of the male genital organs and the development of male somatic sex characters. After birth, when the male sexual hormones of

the foetal male partner cease, the freemartin acquires the body proportions of an ordinary "castrate."

The question confronts us, "why do we not have a feminization of the male foetus instead of a masculinization of the female in these cases of opposite-sexed twins?" The most probable explanation for this condition is that the male sex hormones begin their action sooner than the female ones. The male gonads become differentiated in the bovine foetus when it is as small as 19 M.M. long. It may also be that the male sexual gland dominates quantitatively over the female, the former being sooner or more highly developed than the female gonad during early embryonic life. The interstitial cells of the testicle produce the internal secretion or hormone, therefore the sterile freemartin may be considered as being a female modified by the sex hormone of the male twin, which circulates in the vessels of both individuals during foetal life.

The foetal membranes (chorions) of twin sheep are also fused, but there is no anastomosis of the blood vessels. In cases of this kind common in sheep, goats and deer, the female of these two sexed twins is normal from both the anatomical and functional standpoints. The same is true in two sexed twins in cattle if there is no vascular anastomosis through the fusion of the chorions. The fusion of the chorions takes place at or about the time of the beginning of sex differentiation.

In the testes of mammals the interstitial cells are present from the earliest beginning of sex differentiation. These cells are formed from Pfluger's cords and are present in the very early embryonic life of the individual. In the ovary the differentiation occurs later than in the testes, because the first generation of ingrowths from the germinal epithelium forms only the medulla, while the cortex is formed from the second ingrowth. This takes a little time and permits the interstitial cells of testicle of the male, of the two sexed twins, to produce the hormone, sometime before the internal secretion of the ovary is ready to exert its influence on the developing foetus of which it is a part. The product of the interstitial cells acts as a differentiating factor sufficiently strong to cause deviation from the common path of somatic growth and to stimulate the development of characters of sex in such susceptible organism as it may be carried to, through the anastomosing of circulations of two sexed twins. The process of birth destroys the anastomosis of the circulation between the twins, thereby preventing further invasion of the "female" twin's circulation with the internal secretion from the testes of the male twin. The withdrawl of this hormone permits alterations to occur in the somatoplasm of the "female" twin which are in proportion to the degree of establishment and dependence of such characters upon the influence of the gonads. Hence we see all degrees of variation from the normal female characters, be they gonadal, tertiary or somatic.

Experimental hermaphroditism has been practised and enlightening results have been obtained on many angles of the problem of intersexuality. While intrauterine castration has failed, transplanting of gonads has been quite successful and this method has of necessity been generally adopted. The simultaneous presence of the male and female gonads in the same individual has been shown to bring about an intrasexual condition in young animals. This has been proven by a number of investigators, by bringing about a "neutralized" condition and then simultaneously engrafting both testis and ovary. This procedure influenced the somatic characters in the male guinea pig to the extent of developing thereon teats as large as those of an ordinary female and bringing about lactation in some males. The growth of the penis and seminal vesicles was normal in these males.

DEPARTMENTS OF HISTOLOGY AND APPLIED PATHOLOGY

As heretofore the work of these departments is that of instruction of students in Zoology, Embryology, Histology, and Meat Hygiene, together with the usual routine work as carried out in the pathological laboratory of the college. The preparation of specimens and stained sections for microscopical study for teaching purposes is an important part of the work undertaken by these departments. It has been found from past experience that properly cut and carefully stained sections are essential as a means of illustrating the histology of normal tissue and are equally important in demonstrating the changes that occur in tissue during disease. To this end specimens in the college collection are constantly being added to and improved upon, so that at present there are upwards of two hundred different sets of slides prepared for the students' use. These sets each contain a sufficient number of slides to allow that each individual student in a class receives a section to examine with the microscope. Careful drawings are required to be made and the various drawings must be properly inscribed.

During the past summer, as in other years, these departments have offered a service to the veterinarians and stock owners of the Province whereby specimens of diseased organs, dead and sometimes living animals, are examined and a report as to the condition, together with advice, is forwarded to the interested party. This service is being made use of and the number of calls upon the laboratory for diagnosis and advice is steadily increasing. The fox ranches of Ontario and other provinces have made many calls for assistance as will be observed in the table below. This department has prepared and issued several thousand doses of bovine anti-abortion vaccine and bacerin. This service is also growing and is apparently giving satisfaction to the owners.

During the time the college is in session the material forwarded to the laboratory for examination and diagnosis forms a very necessary and valuable adjunct to the class work of the students, giving the teacher the opportunity of demonstrating the actual diseased condition in the gross specimen and at the same time familiarizing the student with the proper means and methods of arriving at a correct diagnosis in a scientific manner.

Below will be found a table setting forth the various diseases dealt with and the number and kinds of animals involved. A comparison between this table and those of previous years will demonstrate the fact that the number of examinations is steadily increasing as time goes on.

Nature of Case	Cattle	Sheep	Horses	Swine	Dogs	Cats	Foxes	Rabbits	Fowl	Total
Tuberculosis	3	......	......	......	......	......	......	......	4	7
Tumors	5	......	3	......	13	2	......	......	18	41
Pneumonia	5	1	1	9	......	......	18	3	......	37
Parasites	4	8	1	......	28	4	275	3	1	324
Poison	2	......	......	......	4	1	......	......	......	7
Intestinal Disease	......	3	1	8	2	......	12	1	......	27
Abscess Formation	3	......	2	1	......	......	......	2	......	8
Peritonitis	......	......	......	3	......	......	14	1	......	18
Nephritis	1	......	......	......	1	......	......	......	......	2
Goitre	......	......	......	1	......	......	......	......	......	1
Actinomycosis	2	......	......	1	......	......	......	......	......	3
Tissue from Operations	3	1	8	2	10	......	......	......	2	26
Inspection of Meat	3	......	......	3	......	......	......	......	2	8
Pseudo-leukemia	......	......	......	......	1	......	......	......	......	1
Leukemia	......	......	......	......	......	......	......	......	4	4
Hemorrhagic Septicemia	2	2	......	1	......	......	......	......	......	5
Miscellaneous	6	......	......	2	3	2	......	......	2	15

THE BLACK FOX INDUSTRY IN ONTARIO

H. E. Batt, B.V.Sc.

It is well to recognize, in dealing with animals whose recent ancestors lived in a wild, free state, that domestication is exposing the creatures to artificial conditions, the results of which may tend to kill off or weaken the particular species being experimented with. The fox industry is one of the best examples of a recent attempt at the domestication of a wild animal and some very interesting facts may be noticed in connection with it.

Our well-known domesticated animals are the result of countless generations of breeding, during which time they have gradually accommodated themselves to conditions vastly different from those encountered in their original wild state. It is well understood by persons who have the care and feeding of our domesticated animals that they are subject to diseases and to parasitic invasions, some of which are serious and grave. On the other hand, one must not forget that they have, in many cases, acquired a remarkable resistance to disease, and that this resistance has taken ages to develop. Taking one instance, that of resistance to parasites, and comparing the results or extent of parasitic invasions in the dog and fox, it will be observed that the dog is favoured in as much that the average dog suffers less from the mechanical or the toxic affects produced by parasites than does his relative, the semi-domesticated fox. This is in keeping with medical findings in the study of the affects of disease upon the aboriginal races of mankind. The dog is one of, if not the earliest of animals to be domesticated and has gradually acquired through the ages a resistance to parasites which, when compared to that of the fox, is remarkable.

The fox in its wild state, moving as it does over comparatively large areas, is able to maintain itself in a fairly clean state in so far as parasites are concerned. So far as the college is aware the fox in the wild state is not so liable to harbour parasites as is the penned fox, although our records show that tapeworm is found in the wild fox. These the wild foxes no doubt acquire from rabbits or mice. Tapeworm is very rare in penned foxes.

The fox industry is here to stay and is rapidly being put upon a commercial basis and will no doubt expand far beyond its present state, provided the ever-present and growing menace of the internal parasites can be overcome. It is well known to the older fox ranchers that some fifteen or twenty years ago the captive foxes suffered very little from the ravages of parasites, whereas to-day it is an unfortunate fact that the parasites are increasing rapidly and the college records show that few, if any ranch foxes, are free from parasitic infestation.

The problem of parasite control in foxes is of the greatest importance to the industry, in fact at the present time parasites threaten to cripple the development of fox ranching to a greater extent that many ranchers are aware and, unless measures are taken to combat the spread of parasites, many of the ranches will be unprofitable. This may seem to be a somewhat pessimistic view but it has been arrived at after a study of several years' records.

There is little doubt that the time is coming when the man who can offer parasite-free foxes will find a more ready sale for same.

From a study of the life history of the common parasites infesting the fox pen it would seem imperative that the old system of earth floors must be done away with before we can hope to eradicate internal parasites. The present and next generation of fox ranchers cannot afford to wait until generations of

captive foxes build up an immunity, or at least a greater resistance to internal parasites. Man having upset nature's scheme in so far as the fox is concerned must now be prepared to upset nature's scheme in regard to the parasites. The college is advocating the placing of permanent, impervious flooring in fox pens. Many ranchers object to concrete floors not only on account of expense but partly because concrete floors are cold and damp. Some few ranchers are placing wooden floors in the pens. These floors are laid so that the joints are as tight as possible. It has also been suggested that the floor be tarred. It is hoped by this method to prevent any of the parasite eggs from reaching the ground and thus cutting short the life cycle because it has been demonstrated beyond doubt that the eggs of many of the parasitic worms must go through a form of development in or on damp ground, and unless they do so they cannot hatch or develop if taken into the stomach of an animal. It is confidently expected that a board floor, kept clean and exposed to sun and air, will cut short the parasite's life cycle. The idea that parasites are long lived is erroneous and there is little doubt that the lung worms in a vigourous adult fox will die out in some months if reinfestation can be prevented.

The College is watching with interest the outcome of this method of fox ranching, and will keep in touch with the situation.

FASCIOLIASIS IN A COW

H. E. Batt, B.V.Sc.

Last May the college laboratories received some specimens of intestinal parasites taken from the rumen of a Jersey cow. The history furnished showed that the patient, an adult Jersey, was in apparently good health up to the evening before death. Next morning she was found dead in the staunchions. A post-mortem examination revealed the presence of thousands of short, plump, somewhat flattened worms, some free in the ingesta, and others clinging to the mucous membrane of the abomasum and rumen.

The parasite was classified as being the *Amphistomum cervi* (A. conicum), and the case is of interest because of the fact that as far as the college records show it is the first time that specimens of this particular species of parasite have been submitted to this institution for recognition. The specimens were sent from New Jersey, U.S.A., but in the absence of any records it is impossible to say whether or not the parasite is ever found in Canada.

The A. cervi are classed within the Phylum Platyhelminthes being related to the liver flukes. They are about six to seven m.m. in length, the body being somewhat conical in form. The anterior end is narrow, while the posterior portion is fairly wide and slightly curved ventrally. The cuticle is tough and the animal is slightly reddened at the extremities. They are hermaphroditic, the genital orifices being placed central and medial about the anterior third of the parasite. Little or nothing is known of their life history. However, some authorities are of the opinion that these flukes, like the more common liver fluke, go through a portion of their life cycle in water or damp spots. Therefore it would seem reasonable that, in the event of a herd becoming infested with this species of fluke, removal of the cattle to higher and dryer pastures would be the proper steps to take. The college has not had the opportunity of suggesting or trying any medicinal treatment for the eradication of this particular species of parasite.

DEPARTMENT OF BACTERIOLOGY

During the year the work of this department was carried out as described under the following headings:

1. Teaching.
2. Preparation of biological products.
3. Research and investigation.
4. Routine examination of specimens.

Teaching.—During the college session lectures on bacteriology were given to the second, third and fourth-year classes, and laboratory work in bacteriology to third and fourth years. A course of lectures and practical work was also given to the fourth-year class in milk hygiene and poultry diseases.

Preparation of Biological Products.—This comprised the preparation and distribution of 1,470 doses of avian diphtheria vaccine and fifteen autogenous bacterins for use by qualified veterinarians.

Research and Investigation.—Experimental work was carried out with *Salmonella pullora* infection, disinfection of eggs and incubators, the bacteriophage, internal parasites, and paralysis in fowl. Reports, where the work has advanced sufficiently to justify it, are submitted in the accompanying appendices.

Routine Examination of Specimens.—Routine work consisted of the serological examination of samples of fowl blood, and the bacteriological, or such other examination as was required, of other specimens. In connection with the blood tests I desire to express my appreciation of the work done by Miss Le Grand, who has borne the brunt of the routine work, enabling me to give time to experiments that would not otherwise have been possible. The number of samples tested was 7,375 more than last year, while thirty-nine more bacteriological or post-mortem examinations were made than during the previous twelve months.

Blood Serum Examinations

Animal	Disease	No. of samples received	Positive	Suspicious	Negative	Unfit for testing
Fowl....	*Salmonella pullora* infection	19,507	2,751	8	16,473	275

SYNOPSIS OF BACTERIOLOGICAL AND OTHER EXAMINATIONS COMPRISING 953 SPECIMENS

Condition or Disease	Horses	Cattle	Sheep	Swine	Poultry	Dogs	Miscellaneous
Actinomycosis	......	1	......	......	......	......	Feces, 2
Abortion	......	6	......	......	......	......	Canaries, 2
Abscess and other infections	11	22	7	6	22	3	Fox, 1
Blackleg	......	1	......	......	......	......	Water, 6
Bacillary white diarrhea	......	......	......	......	190	......	Milk, 12
Pullora-infected ovaries	......	......	......	......	6	......	Eggs, 7
Adult pullora infection	......	......	......	......	6	......	Meat, 1
Rachitis	......	......	......	......	1	......	
Other chick diseases	......	......	......	......	65	......	
Colds or roup	......	......	......	......	12	......	
Avian diphtheria	......	......	......	......	18	......	
Nutritional conditions	......	......	......	......	65	......	
Range paralysis	......	......	......	......	26	......	
Transient paralysis	......	......	......	......	5	......	
Coccidiosis	......	......	......	......	44	......	
Hemorrhagic septicemia	......	2	......	......	9	......	
Cholera-like diseases	......	......	......	......	3	......	
Fowl typhoid	......	......	......	......	1	......	
Roundworms	......	......	......	......	24	......	
Tapeworms	......	......	......	......	67	......	
Roundworms and Tapeworms	......	......	......	......	7	......	
Other parasites	......	......	......	......	9	......	
Peritonitis	......	......	......	......	39	......	
Infection of oviduct	......	......	......	......	11	......	
Impaction of crop	......	......	......	......	5	......	
Visceral gout	......	......	......	......	5	......	
Cloacitis	......	......	......	......	2	......	
Leukemia	......	......	......	......	11	......	
Tuberculosis	......	......	......	......	57	......	
Enterohepatitis	......	......	......	......	35	......	
Poisoning, weeds, etc	1	......	......	......	15	......	
Tumors	......	......	......	......	25	......	
Mastitis	......	13	......	......	......	......	
Cystic oviduct	......	......	......	......	2	......	
Hemorrhage	......	......	......	......	14	......	
Subcutaneous emphysema	......	......	......	......	2	......	
Egg bound	......	......	......	......	2	......	
Putrid and not diagnosed	2	6	1	1	33	1	
Totals	14	51	8	7	838	4	31

SALMONELLA PULLORA INFECTIONS.

RONALD GWATKIN, D.V.SC.

In *Some Notes on Salmonella pullora Infection* (Ann. Report, Ont. Vet. College, 1925), we stated our intention of examining more closely cultures of gram negative rods isolated from chicks, on account of the possibility of *Eberthella sanguinaria* being confused with *Salmonella pullora*. This was done during the spring with chicks received for examination and results are embodied in this paper. In addition, chicks were examined for the presence of lung infections only and this is also reported on in this paper.

The question of normal agglutinins was also studied, as it is of the utmost importance to have knowledge regarding this. While we were unable to examine a large number of birds for this purpose the results probably represent what may be expected in normal agglutinins against *Salmonella pullora*. Details of this work are also given later.

We have not been able to do further work on adult infection up to the present time, but experiments are planned to commence towards the end of this year, at which time positive birds will be available. The importance of a full knowledge of this subject can not be overestimated in the control of bacillary white diarrhea. Such small experiments as we have attempted have been inconclusive.

While many blood samples have been examined it is unfortunate that in many cases definite information could not be obtained as to hatchability and viability of chicks. Only those engaged in such work realize the difficulty of obtaining reliable information, or indeed, in some cases, information of any kind. In almost all reports considerable satisfaction has been expressed regarding chick raising, even after the first test. As would be expected, however, outbreaks of bacillary white diarrhea have occurred in some tested flocks. Freedom from such a possibility could not be expected until by several consecutive tests a flock has been shown to be clean. Weaver (Rep. Vet. Director Gen. Canada, 1926) reports that the viability of the chicks from an infected flock over a period of six years averaged 39.5 per cent. After one test and removal of reactors the viability was 66.4 per cent. Second test of this flock gave a decrease from the first test in the number of reacting birds of 24.8 per cent.

We have found considerable variation in the number of reactors after the first and second tests. In some cases there was a marked reduction, while in others it was slight. In one flock there were 8.4 per cent. reactors after the first test and 5.7 per cent. after the second. Viability was much improved, but at this time cod liver oil was introduced into the diet and doubtless must be given some credit in this regard. It is interesting to note that there would not have been more than 4 per cent. if the reduction had been equal throughout the flock, but in one comparatively small group there was an increase over the number of reactors of the previous year. Conditions appeared to be the same in all these groups.

In another flock of 340 birds on which we had accurate figures, hatchability was often low and chick mortality ran from 25 to 75 per cent. and was becoming worse. After the first test in which sixty-two reactors were removed, there was very little chick mortality and after the second test, in which only one reactor was found, most of the customers reported raising 95 per cent. of the chicks. The reduction of reacting birds was unusually good in this instance and was probably due in a large measure to the conscientious work of the owner.

In yet another flock, 60 per cent. of the chicks died the season before testing. The following season no cases of bacillary white diarrhea occurred among chicks hatched from eggs from these birds, while on the other hand the mortality was as high as ever in chicks hatched from the eggs of a group of these birds that had not been tested. Separate incubators were used.

As already stated, good results were obtained in most flocks and the owners of most tested flocks are anxious to continue the work. In one large flock with fully 50 per cent. reactors results were apparently not satisfactory, though no definite figures could be obtained. One of the principal troubles in this case was the necessity for disposing of half the flock, which we believe was not done.

While in most badly infected flocks there is a more or less heavy chick mortality, yet chicks may be quite satisfactorily raised at times. In many outbreaks it appears probable that some external factor has lowered the bodily resistance, permitting the infection to make headway. Flocks A and B illustrate the difference in hatchability and mortality in two small flocks with about the same number of infected birds. These results were observed the season before the testing was carried out. Reports have not yet been received on results subsequent to testing.

A. Fifteen out of thirty-six birds were reactors. The eggs from this flock had a hatchability of 34 per cent., and the chick viability was about 33 per cent.

B. Twenty-four out of forty-five birds were reactors. Hatchability was about 58 per cent. and viability of chicks 92 per cent.

In another flock sixty reactors were removed and excellent results were obtained the following season. The reactors were purchased for egg production for food only. They laid well all winter and the purchaser decided to use the eggs for hatching. While we have not the actual figures, results were very bad both as to hatchability and chick mortality, the contrast between these two flocks being most marked.

At the time of submitting this report we have received information on the viability of half the chicks sold by a hatchery company for whom we tested all flocks from which eggs were used. A circular letter was sent out to all purchasers asking for particulars, and to date 11,676 chicks have been reported on. The mortality from all causes was nineteen per cent. Unfortunately we were dependent upon the purchasers for an opinion as to the cause of death, no birds having been sent in for examination, so that we cannot offer any suggestion regarding this, other than that the majority of losses were stated to be due to accidents and chilling. Approximately seven per cent. were claimed to be bacillary white diarrhea or cause of death unknown. Actually, of course, many more losses might have been due to this infection. Next year an effort will be made to check at least the heavy losses by bacteriological examination. Meanwhile the only information of value is the fact that mortality from all causes was nineteen per cent. Testing will be repeated on these, and any new flocks taken on, and records kept of reactors removed and chick mortality, so that in time this project should supply valuable information regarding the test and its application.

In numerous other flocks, in fact in the majority of those tested, good results have been reported, but as we are unable to give figures no specific mention of these will be made. While realizing that there is much that is not yet understood regarding the test and its application, the author is convinced of its value in the majority of cases. The fact that year after year owners have had chick trouble and following testing this trouble ceases or is much reduced, in spite of the fact that no other changes have been made, is a good indication that under certain conditions the application of the test is of definite value. Even if it were not of

value in cleaning up a flock it would still be of the greatest benefit in selecting negative flocks from which to purchase eggs or birds and thus build up flocks free from infection.

Normal Agglutinins

Rebrassier (Jour. A.V.M.A., Feb., 1926) considers that the normal agglutinative titre is 1-10. This was based on a small number of birds evidently not from a negative flock. It is necessary to have definite knowledge regarding this in order to be certain that results obtained in the dilution or dilutions employed in the test are not due to normal agglutinins rather than those developed by infection. While the number of birds employed in this experiment is not large, we believe it is enough to indicate the probable range of the normal agglutinin. Negative flocks were used, that is, flocks where all were negative in the diagnostic dilution of 1-50 and where there was no chick trouble. Four flocks, comprising 214 birds, were examined. The blood was set up in dilutions of 1-10, 1-25 and 1-50, as described in our annual report for 1925. The highest reactors from three of the flocks were examined bacteriologically for the presence of *Salmonella pullora*.

Twenty samples showed some agglutination in dilutions of 1-10 and five of these showed slight agglutination in 1-25. The remaining 194 showed no agglutination in any dilution. Table 1 shows the reactions of these twenty samples.

Table 1

Flock	No. in flock	Sample No.	Dilutions			Examination of Ovary
			1-10	1-25	1-50	
A	68	13	4	0	0	Not examined
A	68	24	C	0	0	" "
A	68	35	3	0	0	Negative for *S. pullora*
A	68	38	3	0	0	Not examined.
A	68	53	4	0	0	Negative for *S. pullora.*
B	19	4	C	2	0	" " "
B	19	7	C	0	0	Not examined.
B	19	9	C	2	0	Negative for *S. pullora.*
B	19	13	C	2	0	" " "
B	19	14	4	0	0	Not examined.
B	19	18	4	2	0	" "
C	92	59	C	0	0	Negative for *S. pullora.*
C	92	62	C	0	0	Not examined.
C	92	69	C	0	0	Negative for *S. pullora.*
C	92	85	C	0	0	Not examined.
C	92	87	C	2	0	Negative for *S. pullora.*
C	92	123	4	0	0	Not examined.
D	35	1	C	0	0	" "
D	35	14	C	0	0	" "
D	35	21	3	0	0	" "

Results are recorded in this table by the system recommended by Hadley (Jour. Imm., 1917), which is as follows:

C—Complete agglutination.
O—No agglutination.
1 to 4—Intermediate grades of agglutination.

In twelve cases there was complete agglutination in 1-10, five gave a reading of 4, and three samples a reading of 3 in this dilution. Fifteen samples showed

no agglutination in 1-25, and five gave a reading of 2 in this dilution. All were negative in 1-50. No birds were examined in flock D. Two were examined for presence of *Salmonella pullora* from flock A, three from B, and three from C. Ovaries were plated on agar and also planted in broth which was plated after forty-eight hours. The technique employed was described on page 61 of the annual report for 1925.

Summary.—Examination of four negative flocks comprising 214 birds showed that normal agglutinins did not produce more than a slight reaction in 1-25 and that the diagnostic dilution of 1-50 was satisfactory from this viewpoint. Birds giving the highest reactions in three of the four flocks were found free from *Salmonella pullora* on bacteriological examination.

Examination of Cultures from Chicks and Adult Birds

In view of the fact that Beaudette (Jour. A.V.M.A., Sept., 1925) reported the isolation of *Eberthella sanguinaria* from the heart blood of baby chicks from different flocks, from an unabsorbed yolk, and the ovary of a hen, it was decided to examine more closely the fermentation reactions of cultures isolated from chicks in the course of our routine work. At the same time cultures isolated from ovaries and other organs of adult birds were similarly examined, as well as a number of known cultures of *Salmonella pullora* and *Eberthella sanguinaria* as controls.

The first complete description of *Salmonella pullora* was by Rettger and Stoneburn in 1909 (Bul. 60. Storrs Agr. Exp. Sta.). They reported absence of gas production in maltose, lactose, saccharose, inulin and dextrin. About twenty per cent. of gas was produced in dextrose and mannite. Some strains did not produce gas in any of the sugar media, though acid was quite apparent.

Smith and TenBroeck (Jour., Med. Res., Jan., 1915) published a paper on the relation between *Salmonella pullora* and *Eberthella sanguinaria*. They found that freshly isolated cultures of the former produced a little gas in dextrose and mannite or in dextrose only, while the latter did not produce gas in either. They also found that maltose was acidified by *Eberthella sanguinaria* but not by *Salmonella pullora.*

Rettger and Koser (Jour Med. Res., January, 1917) found that acid but no gas was produced in dextrin, maltose and dulcite by *Eberthella sanguinaria.* No visible change was produced in these by *Salmonella pullora.* Dextrose and mannite were fermented by the latter with acid and gas production. No acid was produced in lactose. Fourteen carbohydrates and higher alcohols were used. They found that the methyl-red test applied to cultures grown in one per cent. maltose bouillon was a practical method of distinguishing between the two organisms as *Eberthella sanguinaria* was methyl-red positive and *Salmonella pullora* methyl-red negative.

Goldberg (Jour. A.V.M.A., May, 1917) agrees in general with the previous results. Titrations were carried out to thirty days with twenty different carbohydrates and higher alcohols and the broth control. Maltose was not included.

Krumwiede and Kohn (Jour. Med. Res., July, 1917) in studies on the paratyphoid-enteritidis group, summarize the fermentation reactions of *Eberthella typhi*, *Salmonella pullora* and *Eberthella sanguinaria* on dextrose, maltose, arabinose, rhamnose and sorbite. Maltose fermentation, as found by Smith and TenBroeck, differentiated between *Eberthella typhi* and *Salmonella pullora.* With prolonged incubation the latter showed irregular evidences of fermentation in from sixteen to forty days. They considered this due to hydrolysis rather [illegible] to ferment.

Hadley (Bul. 172, R.I. State Coll., November, 1917) suggests the recognition of a duality of type of *Salmonella pullora* on gas formation, agglutinative power and pathogenicity. Maltose was fermented with acid production by *Eberthella sanguinaria* but not by *Salmonella pullora*. Acid was produced by the former in dextrin and dulcit, but not by the latter.

Mulsow (Jour. Inf. Dis., August, 1919) published a comparative study of *Salmonella pullora* and *Eberthella sanguinaria*. He considered the chief fermentative differences to be production of gas by most strains of *Salmonella pullora* in certain carbohydrates and the failure of *Eberthella sanguinaria* to produce gas in any. Also failure to ferment maltose by the former and acid production by the latter. He reported a few strains of *Salmonella pullora* as fermenting this sugar slightly and also slowness of two strains of *Eberthella sanguinaria* to produce acid in the same. Other differences are also given.

Rettger (cited by Mallmann) reported about this time two distinct strains. One produced gas in dextrose and mannite while the other was strictly anaerogenic in all sugars and alcohols studied.

Hadley, Caldwell and Heaton (Bul. 174, R.I. Exp. Sta., 1919) report on the two types and state that the anaerogenic one was uncommon. Their anaerogenic types from chicks gave gas in dextrose infusion broth but not in dextrose extract broth. From adults the anaerogenic types were constant in both media.

Beaudette, Bushnell and Payne (Jour. Inf. Dis., February, 1923) isolated an organism closely resembling *Salmonella pullora* from chicks "dead in the shell." Variable reactions were observed in maltose and xylose. Apart from this it could not be distinguished from *Salmonella pullora*.

Mallmann (Bul. 68, Mich. State Coll. Agr. Exp. Sta., October, 1925) in studies on *Salmonella pullora* reported that acid production was quite constant in dextrose, mannite, galactose, levulose, mannose and rhamnose. In the other carbohydrates acid production was irregular. Acid was produced by several strains in lactose, though, with one exception, only one of two tubes in each set gave an acid reaction. Extremely variable results were observed in gas production. Two organisms failed to produce gas in any of the carbohydrates. Lactose, saccharose, and maltose were sterilized by filtration on account of their susceptibility to heat.

Rebrassier (Jour. A.V.M.A., February, 1926) concluded that in making a differential diagnosis of *Salmonella pullora* it was essential to ascertain its fermentation activities in dextrose, mannite, lactose and maltose.

The method we adopted was that suggested by Rebrassier. Dextrose, mannite, maltose and lactose were employed in one per cent. solution in beef extract broth with a pH reaction of 7.8 and containing one per cent. Andrade's indicator. Intermittent sterilization in flowing steam and sterilization under pressure of the broth containing sugar was not satisfactory in the case of lactose and maltose as acid was produced in some cases by non-acid forming organisms. The colour was yellower than the normal acid colour but was quite distinct. A number of strains were set up in lactose and maltose broth prepared by sterilizing the sugars in broth for one-half hour in flowing steam on three consecutive days, by twenty minutes at fifteen pounds pressure in the autoclave, and also by the addition to sterile beef extract broth of a ten per cent. solution of the carbohydrate in distilled water sterilized for twenty minutes at fifteen pounds pressure. Excellent results were obtained by the last method which was used throughout this work. The broth was put up in V-shaped tubes with one closed arm. Transfers to sugars were made direct from the plate or from the earliest pure subculture, after twenty-four hours' growth. Tubes were incubated seven days at 37° C.

In most cases where gas appeared it was present in forty-eight hours and in some as early as eighteen hours. In a few cases neither acid nor gas appeared for forty-eight hours and in one instance there was no change until the fifth day. Table 2 gives the source of the cultures and their reactions in the carbohydrates employed.

TABLE 2

Lab. No.	Subculture	Source	Lact.	Malt.	Dext.	Mann.	Per cent. of Gas Dext.	Per cent. of Gas Mann.
1885	Plate	Chick	— —	— —	+ —	+ +	..	10
1884	"	Adult	— —	— —	+ —	+ —	..	..
1911	First	Ovary	— —	— —	+ +	+ +	20	10
1938	Third	Ovary	— —	— —	+ +	+ +	15	20
1945	Plate	Chick	— —	— —	+ +	+ —	10	..
1936	First	"	— —	— —	+ +	+ +	20	25
1938A	Second	Ovary	— —	— —	+ +	+ +	20	10
1969	Plate	Chick	— —	— —	+ —	+ —	..	..
1975	"	"	— —	— —	+ +	+ +	40	Bubble
1981	First	"	— —	— —	+ +	+ +	10	"
1985	"	"	— —	— —	+ +	+ +	50	"
1986	"	"	— —	— —	+ +	+ +	10	"
1987A	"	Ovary	— —	— —	+ —	+ —	..	..
1992	Plate	Chick	— —	— —	+ +	+ +	20	20
1999	"	"	— —	— —	+ —	+ +	..	50
2007	First	"	— —	— —	+ +	+ +	20	10
2008	Plate	Adult	— —	— —	+ —	+ —	..	..
2010	"	Chick	— —	— —	+ +	+ +	5	30
2016	"	"	— —	— —	+ +	+ +	50	50
2020	"	"	— —	— —	+ +	+ +	20	25
2022	"	"	— —	— —	+ +	+ +	..	..
2023	Second	9 weeks chick	— —	— —	+ —	+ +	..	Bubble
2026	Plate	Chick	— —	— —	+ +	+ +	30	50
2029	"	"	— —	— —	+ +	+ +	10	5
2033	"	"	— —	— —	+ +	+ +	Bubble	10
2034	"	"	— —	— —	+ +	+ +	10	10
2034A	"	"	— —	— —	+ +	+ +	10	10
2035	"	"	— —	— —	+ +	+ +	40	10
2041	"	"	— —	— —	+ —	+ +	..	20
2043	"	"	— —	— —	+ —	+ +	..	..
2044	"	Ovary	— —	— —	+ —	+ +	..	5
2049	First	Chick	— —	— —	+ +	+ +	10	10
2050	"	Ovary	— —	— —	+ +	+ +	5	25
2052	Plate	Chick	— —	— —	+ +	+ +	30	10
2055	"	"	— —	— —	+ +	+ +	30	30
2056	"	"	— —	— —	+ —	+ +	..	30
2057	"	"	— —	— —	+ +	+ +	50	50
2060	"	"	— —	— —	+ +	+ +	50	10
2061	"	"	— —	— —	+ +	+ +	50	10
2063	First	"	— —	— —	+ +	+ +	50	10
2066	Plate	"	— —	— —	+ +	+ +	40	40
2068	First	"	— —	— —	+ +	+ +	5	15
2069	Plate	"	— —	— —	+ +	+ +	10	10
2071	"	Adult	— —	— —	+ +	+ —	10	..
2080	First	Chick	— —	— —	+ +	+ +	5	5
2084	Plate	"	— —	— —	+ +	+ +	5	5
2088	First	"	— —	— —	+ +	+ +	30	5
2090	Plate	"	— —	— —	+ —	+ —	..	..
2091	"	"	— —	— —	+ +	+ +	Bubble	30
2098	First	"	— —	— —	+ +	+ +	"	10
2101	"	"	— —	— —	+ +	+ +	40	40
2105	Plate	"	— —	— —	+ +	+ +	40	10
2110	First	"	— —	— —	+ +	+ +	40	Bubble
2120	Plate	"	— —	— —	+ +	+ +	40	10
2122	"	"	— —	— —	+ +	+ +	25	10
2133	First	"	— —	— —	+ +	+ +	25	10
2142	Plate	"	— —	— —	+ +	+ +	10	10

TABLE 2—*Continued*

Lab. No.	Subculture	Source	Lact.	Malt.	Dext.	Mann.	Per cent. of Gas Dext.	Per cent. of Gas Mann.
2144	Plate	Chick	— —	— —	+ +	+ +	50	50
2146	"	"	— —	— —	+ +	+ +	30	30
2161	"	"	— —	— —	+ +	+ —	15	..
2162	"	"	— —	— —	+ +	+ +	10	10
2249	"	Adult	— —	— —	+ —	+ —	..	..
2289	"	Chick	— —	— —	+ +	+ +	Bubble	Bubble
1A	Old	Ovary	— —	— —	+ +	+ +	5	5
554	"	Chick	— —	— —	+ +	+ +	Not	recorded
580	"	"	— —	— —	+ +	+ —	"	"
640	"	"	— —	— —	+ +	+ +	"	"
931	"	Ovary	— —	— —	+ +	+ +	"	"
971	"	Adult	— —	— —	+ —	+ —	..	..
B1	"	Chick	— —	— —	+ +	+ +	Not	recorded
C1	"	Adult	— —	+ —	+ —	+ —	..	..
949	"	"	— —	+ —	+ —	+ —	..	..
1076	"	"	— —	+ —	+ —	+ —	..	..
2263	Plate	"	— —	+ —	+ —	+ —	..	..

+ + = Acid and gas. + — = Acid. — — = No Acid nor gas.

The last eleven cultures in Table 2 were controls. Numbers 1A to B1 were known *Salmonella pullora*. The last four, C1 to 2263, were known *Eberthella sanguinaria*. The first sixty-three represent a subculture from each group of birds examined. It was not possible to plant subcultures from every bird in each group in sugars, on account of the time involved.

None of the sixty-three cultures produced acid in maltose or lactose. Forty-six out of the sixty-three produced gas in dextrose and mannite. Four produced gas in dextrose only and five in mannite only. Eight produced no gas. Of these eight, four were from chicks, three from adult infections, and one from an ovary. Evidently the anaerogenic type is not confined to adults only.

Cultures from Chicks.—There were fifty-three cultures from chicks. Forty-two of these produced gas in dextrose and mannite. Five produced gas in mannite only and two in dextrose only. Four did not produce gas in either sugar. The four flocks from which the anaerogenic cultures were obtained had heavy losses in no way different to many of the other outbreaks due to the aerogenic strains. There was no history of any adult losses in these flocks.

Cultures from Ovaries of Carriers.—Six cultures from ovaries were examined. Four produced gas in both sugars, one in mannite only and one did not produce gas in either. Three were from the same flock (1938, 1938A and 1987A). The first two produced gas in both sugars while the third did not produce gas in either. These birds were healthy and were selected by the agglutination test for use in some experimental work. The other three (1911, 2044 and 2050) were from different flocks. Death was not due to *Salmonella pullora* infection, cultures simply being made from the pathological ovaries for experimental purposes.

Cultures from Adult Birds.—Cultures from four adult birds, from organs other than the ovary, were examined. Three formed no gas in either sugar and one formed gas in dextrose only. Briefly the particulars of these are as follow:

No. 1884. No gas from dextrose and mannite. No history. Peritonitis, cheesy exudate. Pericarditis, heart and mass of exudate in pericardial sac

weighed 193.5 grammes. Liver enlarged, 184 grammes, fine necrotic foci. Spleen normal. Pneumonia. Intestinal inflammation. Ovary showed typical follicles of *Salmonella pullora* infection.

No. 2008. No gas from dextrose and mannite. Lost twenty-five birds in two weeks. Symptoms of a bacteremia. Livers enlarged. Hemorrhage from liver in one case and from spleen in the other. *Salmonella pullora* isolated from liver of both birds.

No. 2071. Gas in dextrose only. No history. Peritonitis, cheesy exudate. Oviduct inflamed. Liver pale and studded with hemorrhagic spots. Hemorrhage from liver and also into follicles of the ovary. Other follicles were typical of the infection. Pure culture of *Salmonella pullora* isolated from exudate in abdominal cavity.

No. 2249. No gas from dextrose and mannite. No history. Peritonitis. Oviduct large and inflamed. Ovary showed typical infected follicles. Liver friable. Heart and lungs normal. Pure culture of *Salmonella pullora* isolated from heart, liver and exudate.

Summary.—Cultures from fifty-three outbreaks of "bacillary white diarrhea" were shown to be *Salmonella pullora*. Four strains were anaerogenic. One of six strains from ovaries was anaerogenic. Three out of four cultures from infections in adults were anaerogenic. Intermittent sterilization in flowing steam and continuous sterilization in steam under pressure were not found suitable for lactose and maltose. The addition of an autoclaved solution of the carbohydrates in distilled water to autoclaved extract broth was satisfactory.

Lung Infections in Chicks

In the routine examination of chicks it was our practice to make cultures from the heart and liver and sometimes from the intestine. It was observed on one occasion that cultures from chicks in a flock that had been shown to be affected with bacillary white diarrhea did not give any evidence of *Salmonella pullora* in spite of the fact that about a dozen chicks were examined. Cultures were then made from the lungs in addition to the liver and heart as a routine procedure, even in cases where there was no obvious change. Table 3 shows the condition of the lungs, whether or not *Salmonella pullora* developed, and the comparative amount of growth from liver and heart and lungs of sixty-five chicks. One culture was made from liver and heart and one from the lungs.

Table 3

Lab. No.	Condition of Lung	Lung	Liver Heart
2016	Slightly congested	+	+
2020	Congested	+	+
2020A	"	—	+
2022	Slightly congested	++	+
2026	Nodules, pneumonic	+	+
2026A	" "	+	+
2026B	" "	+	+
2029	Not much changed	+	++
2029A	" "	++	+
2033	Pneumonia, pleurisy	+	++
2034	Appeared normal	+	++
2034A	Pneumonic	+	+
2034B	Appeared normal	+	++
2034C	Congested	+	+

TABLE 3—*Continued*

Lab. No.	Condition of Lung	Lung	Liver Heart
2041	Pneumonic	+	+
2043	Slightly congested	+	+
2043A	" "	+	+
2043B	" "	—	+
2044	Pneumonic	++	+
2049	"	+	—
2052	"	+	+
2055	"	++	+
2055A	Nodules	+	++
2055B	"	+	++
2055C	"	+	++
2055D	"	+	++
2056	Pneumonic	++	+
2056A	Congested	+	+
2057	"	+	—
2057A	Pneumonic	+	+
2057B	"	+	++
2060	Congested	++	+
2060A	Appeared normal	+	+
2060B	" "	+	++
2061	Not much changed	+	+
2061A	Nodules	+	+
2066	"	+	—
2068	Nodules, pneumonic	+	+
2068A	" "	+	+
2068B	" "	+	+
2068C	" "	+	+
2069	" "	+	+
2069A	Pneumonic	+	+
2080	Nodules, congested	+	+
2080A	Congested	—	+
2084	"	+	+
2088	"	+	++
2088A	"	+	++
2088B	"	+	+
2090	"	—	+
2090A	"	+	+
2090B	"	+	+
2091	Appeared normal	+	+
2091A	" "	+	+
2105	Slightly congested	+	+
2105A	" "	+	+
2110	Congested	+	+
2110A	"	+	++
2120	"	++	+
2120A	Appeared normal	++	+
2122	Congested	+	+
2133	"	++	+
2133A	"	+	+
2142	Pneumonic	+	++
2142A	"	+	+

+Growth of *Salmonella pullora.* — No growth of *Salmonella pullora.*
++More growth than in the other culture

Of the sixty-five cultures in Table 3, three gave growth of *Salmonella pullora* on cultures from the lungs but not from the liver and heart. No. 2049 was three weeks old, No. 2057 eighteen days, and No. 2066 four weeks. The second was one of a group of three. The other two chicks of the group gave an equal amount of growth from lung and liver and heart in one case and more from the liver and heart in the other. In four chicks the lung cultures were negative. Nine lung

cultures gave more growth than the corresponding ones from the liver and heart. Fifteen liver and heart cultures gave more growth than the corresponding ones from the lung. It was realized that a variable amount of material spread on the plates would affect the count and only marked differences are recorded. In some cases there were only a few colonies on both cultures while in others there was very heavy growth. Nodules were present in the lungs of fifteen chicks. Fourteen of these varied from seven to twelve days old. One was four weeks. Nodules are mistakenly believed by some poultrymen to occur only in aspergillosis.

Summary.—Three cases of lung infection alone were observed in sixty-five chicks examined, showing the necessity of culturing the lungs in routine examinations. A number of lungs which appeared normal or very slightly changed gave more growth than the other organs. Well-marked nodules occurred in fifteen cases.

Summary of Experiments

1. Results of the application of the agglutination test, when followed with suitable sanitary measures, were usually good. Chick mortality returned to normal or was much reduced. In some cases no benefit was observed. These were usually flocks which had a large number of reactors.
2. Examination of four negative flocks, comprising 214 birds, showed that normal agglutinins did not produce more than a slight reaction in 1-25 and that the diagnostic dilution of 1-50 was satisfactory from this viewpoint.
3. Fifty-three cultures obtained from outbreaks of bacillary white diarrhea were shown to be *Salmonella pullora*. Four of these strains were anaerogenic. Three out of four cultures from infections in adult fowl were anaerogenic. To avoid splitting lactose and maltose the broth and sugars were autoclaved separately.
4. Three cases of lung infection alone were observed in sixty-five chicks examined, showing the necessity of culturing the lungs in routine examinations. A number of lungs that appeared normal or very slightly changed gave more growth than the other organs. Well-marked nodules occurred in fifteen cases.

BACTERIOPHAGE EXPERIMENTS

Ronald Gwatkin, D.V.Sc.

During the past year some experiments were carried out with the bacteriophage in connection with *Salmonella pullora, Pasteurella avicida,* and *Escherichia coli,* with the object of observing d'Herelle's phenomenon and studying the immunizing power of the principle in bacillary white diarrhea of chicks.

The bacteriophage is a principle that is said to have the power of dissolving bacteria *in vivo* and *in vitro.* For details regarding it the reader is referred to d'Herelle's books, "The Bacteriophage and Its Behaviour," "The Bacteriophage," "Immunity in Natural Infectious Disease," and to the many articles referred to in the bibliography of the first-named book. D'Herelle claims that the bacteriophage is an autonomous being independent of the bacterium at the expense of which it multiplies, and he has named it *Protobios bacteriophagus* (Syn. *Bacteriophagum intestinale*), d'Herelle, 1918. As yet there is not an agreement of opinion as to the nature of the bacteriophage, but in this article the terms used by d'Herelle, which imply the living nature of the principle, have been adopted

for purposes of description only, without the intention of expressing an opinion either for or against this theory.

Technique of Obtaining the Bacteriophage.—In the first experiments difficulty was experienced through the use of filter candles of too large a size in which the fluid was lost. As soon as suitable candles were obtained this was overcome. Briefly, our technique was as follows: The ovary or feces to be examined was cultured on agar plates. It was then planted in 50 c.c. of beef extract broth with a pH reaction of 7.8 and incubated at 37° C. overnight. The next day this culture was filtered through paper prepared by first filling the funnel with water containing a pinch of fuller's-earth and allowing this to pass through, filling up the paper and making a very fine filter which removed all rough material from the liquid. It was then filtered through a sterile Berkefeldt candle, 2½ x ⅝ inches, into a sterile flask from whence it was pipetted into sterile tubes and sealed in the flame if not required for use at the time. This filtrate was added to 10 c.c. of a definitely cloudy suspension of a twenty-four hour culture of the bacteria recovered from the material under examination, or a stock culture, and the suspension was incubated at 32° C. and observed regularly for evidence of clearing. Agar plates were made from tubes showing bacteriophagy to determine whether or not all bacteria had been dissolved. The filtrate was inoculated into broth for a sterility control or some of the filtrate itself was incubated. This is in general d'Herelle's technique. He advises a very satisfactory method of filtering, for which, however, our equipment was not adapted.

Negative Cases.—Birds from which a bacteriophage was not recovered are grouped together for convenience, though they were examined at various times throughout this work.

No. 18590.—The first case tried was a normal bird. Cultures were made from the ovary, which was then planted in 50 c.c. of broth. Five grammes of feces were planted in the same quantity of broth and incubated until the next day and agar cultures also made. *Salmonella pullora* did not develop on plates from the ovary. The broth cultures were filtered through treated paper and candle. Suspensions of a stock culture of *Salmonella pullora* (No. 640), and *Escherichia coli* from the feces were prepared. One drop, ten drops, and 2 c.c. of each filtrate were added to 10 c.c. of the corresponding suspensions, while one tube of suspension alone was kept as a positive control. They were incubated overnight. There was no evidence of dissolution and agar plates made from the filtrate tubes gave the same growth as the controls.

No. 1873.—Two birds with peritonitis. *Escherichia coli* predominant organism isolated. Made broth culture from feces of both. Inoculated 1 c.c. of filtrate from each bird into 10 c.c. of a suspension of the organism. There was no evidence of bacteriophagy and growth from filtrate tubes and controls appeared the same on agar plates after incubation.

No. 281.—Made ovary and feces cultures in broth and also agar plates. Incubated overnight. Two cubic centimeters of filtrate were added to 10 c.c. of a suspension of *Salmonella pullora* (No. 1911). There was no evidence of bacteriophagy. Cultures from the ovary were negative. Plates from the filtrate tube gave the same growth as the control.

Barred Rocks A and B.—Normal birds. Cultures were made from the ovaries and feces. They were incubated overnight and filtered. Ten cubic centimeters of a suspension of *Salmonella pullora* (No. 1911) were inoculated with one drop,

ten drops, and 2 c.c. of the filtrate. No bacteriophagy occurred nor was there any variation from the normal on plates made from the filtrate tubes when compared with the contiol. *Salmonella pullora* was not recovered from either ovary.

No. 11163.—This bird gave a negative agglutination reaction. The ovary was cultured on agar plates and planted in broth. After incubation the broth was filtered and 10 c.c. of a suspension of *Salmonella pullora* (No. 1911) was inoculated with one drop, ten drops, and 2 c.c. of the filtrate. No dissolution occurred nor change in appearance of growth when plated and compared with the control. *Salmonella pullora* was not recovered from the ovary.

No. 44.—Bird gave negative reaction. *Salmonella pullora* not recovered from the ovary. The inoculation of one drop, ten drops and 2 c.c. of filtrate into 10 c.c. of a suspension of culture No. 1911 did not produce any evidence of bacteriophagy and plates from these tubes did not differ from the positive control.

Cases from which a Bacteriophage was Recovered.—In the following cases a bacteriophage was present in the filtrates, as shown by inoculation into bacterial suspensions.

No. 1835.—Goose died of goose septicemia (*Pasteurella avicida* infection.) Microscopic examination and cultures showed the blood to be swarming with this organism. Five grammes of feces were planted in 50 c.c. of broth, incubated overnight and filtered. Ten cubic centimeters of a suspension of the bipolar organism isolated was inoculated with one drop, ten drops, and 2 c.c. of the filtrate. Next morning Tube No. 3 was quite clear for the lower two-thirds. When handled the growth mixed rapidly throughout the tube. No. 2 was slightly dissolved, while No. 1 appeared the same as the control. Plate from No. 3 showed only about a dozen very small colonies. The dissolved tube was filtered, but a a this time we had only large candles the small amount of fluid was lost.

The growth on the original plate from the goose was washed off with sal solution. One cubic centimeter was fed to each of three hens and 0.5 c.c. injecte subcutaneously into two on January 19th. It was hoped that one might becom ill and recover, thus becoming a suitable subject from which to obtain a bacter ophage against this organism. On January 22nd an injected bird died and th next day a fed bird. The second injected bird was found dead on the morning January 25th. On January 27th the droppings of the two surviving birds, whic had remained perfectly well, were examined in the usual manner for the presen of Avicida-bacteriophage. There was no evidence of dissolution and plates ma from the filtrate tubes gave the same growth as the control.

No. 1911.—This bird died from hemorrhage due to rupture of the liver. (post-mortem examination the ovary was observed to be pathological, cultu were made and *Salmonella pullora* recovered from it. The ovary and 5 gramm of feces were planted in 50 c.c. of broth and incubated overnight. One drop, t drops and 2 c.c. of each filtrate were introduced into 10 c.c. of broth suspensi of the culture isolated. The following morning the tubes inoculated with fe filtrate were normal. In the other set the one drop tube appeared normal, tube with ten drops showed almost complete dissolution, and the 2 c.c. t complete dissolution. This tube was filtered and complete bacteriophagy occur from the inoculation of a few drops of the filtrate. This was carried on satis torily for several transfers and only lost through trouble with the large cand Agar plates from the feces filtrate tubes showed normal growth like the cont [illegible] dissolved tubes gave very few or no colonies.

Nos. 2271 and 167.—Both birds gave a positive agglutination reaction. Ovary of each markedly pathological. Made agar plates from each ovary and then planted them in 50 c.c. of broth, incubated overnight and filtered. *Salmonella pullora* was recovered from each ovary. Tubes containing 50 c.c. of a suspension of *Salmonella pullora* were inoculated with 1 c.c. and 4 c.c. of filtrate. Complete dissolution of the bacteria occurred and plates did not give growth. Filtering and inoculation were repeated and in five hours the fresh suspensions were clear. One drop produced the same result but not as rapidly. These two filtrates combined (A) were used in a chick experiment recorded later. Strain No. 1911 was more readily dissolved by these races than the strains isolated from these two birds.

No. 829.—This bird gave a positive agglutination reaction. Ovary was very pathological. *Salmonella pullora* was recovered on culture. Filtrate was prepared in the usual way from the ovary. Flasks containing 100 c.c. of a suspension of strain No. 1911 were inoculated with 1 c.c. of filtrate. Ten cubic centimeter quantities of a suspension of strains Nos. 167 and 2271, isolated in last experiment, were inoculated with ten drops of filtrate. Six hours later tubes and flasks showed partial dissolution but the following morning were overgrown again. The filtrate sterility control showed growth and on examination the flasks and tubes were found to be contaminated. A mixture of filtrates Nos. 167 and 1911 was filtered and 3 c.c. planted in a flask of suspension of the two strains. The flask became clear in five hours but secondary growth was present next morning. It was filtered and again inoculated into a flask of suspension. This cleared in about six hours and remained clear in the incubator for two days, after which time secondary growth occurred. When plated on agar a few scattered colonies of *Salmonella pullora* developed. One flask of the last lot had been placed in the ice chest when clear and had remained so. It was filtered and 10 c.c. quantities of bacterial suspension were inoculated with one drop, ten drops, and 2 c.c. of the filtrate. Complete dissolution occurred. This was filtered and one drop in 50 c.c. produced complete bacteriophagy. Secondary growth again occurred after two days. A supply of this race of bacteriophage was collected by filtering the flasks when clear and storing in the ice chest. It is referred to as B in later chick experiments.

This filtrate was added to a suspension of a freshly isolated strain of *Salmonella pullora* from a chick (No. 1992.) Complete clearing of all tubes occurred, including the positive control. At the time this was believed to be due to the accidental introduction of filtrate, but the same thing occurred in a tube of broth that had been seeded for chick infection work, and also when the first experiment was repeated. This may have been a mixed culture as referred to by d'Herelle, namely, a mixture of bacteria and bacteriophage. The growth on agar slants did not appear abnormal, but as stated, definitely cloudy suspensions made with this strain underwent complete dissolution.

No. 1878.—This bird gave a positive agglutination reaction. *Salmonella pullora* recovered from the ovary. Procedure was same as in previous cases. Tubes became clear up to 10^{-11}, secondary growth occurred in nine days. Titration on agar gave a count of 5 billion corpuscles per c.c.

No. 1874.—Positive agglutination reaction and *Salmonella pullora* recovered from ovary. Clearing of tubes was only partial up to 10^{-10}. Four billion corpuscles per c.c.

No. 1875.—Positive agglutination reaction. Salmonella pullora isolated from ovary. Clearing of tubes occurred up to 10^{-9}. Never quite clear. Original suspension 1,400,000,000 corpuscles per c.c.

Immunization Against Artificial and Natural Infection.—Kramer (cited by d'Herelle in "The Bacteriophage and Its Behaviour") reports on the use of a bacteriophage suspension in four epizootics in chicks due to *Salmonella pullora.* Following is an abstract of his results.

Observation 17.—Trouble commenced when four days old. Between fifth and tenth day there were eighty deaths out of 137. On the tenth day a suspension of bacteriophage was given in the drinking water. Three more chicks died and the disease was arrested.

Observation 18.—One hundred and fifty of 500 chicks died within first two weeks after hatching. Survivors were given bacteriophage in drinking water. The disease persisted, but with a lessened and very irregular mortality.

Observation 19.—Flock of 500 chicks, six days old. Bacteriophage was given in drinking water. About sixteen a day had died prior to the ingestion. The mortality diminished considerably, although during the few days following the ingestion thirty chicks died. The suspension was again added to the water and a second ingestion was accomplished. The disease then ceased.

Observation 20.—Ninety-three out of 200 chicks only were left in this outbreak by the time they were fourteen days old. They were then injected with 0.5 c.c. of the bacteriophage suspension. Two died after the injection and the epizootic ceased.

D'Herelle states: "A favourable result, either in prophylaxis or in therapy, can hardly be expected unless a race of the bacteriophage is used which has a maximum virulence for the pathogenic agent against which the development of an immunity is desired. To attempt to work with races of low virulence is simply to invite certain failure."

All the races used by us were of high but not extreme virulence, but were the most powerful that we isolated or were able to produce by serial passage through broth cultures. Particulars of them are given in connection with the experiments in which they were employed. The following experiments describe briefly attempts to protect chicks against artificial and natural infection with *Salmonella pullora*, by the administration of Pullora-bacteriophage by mouth in single and repeated doses, and by subcutaneous injection.

Artificial Infection.—On March 27th eighteen chicks, twenty-four hours old, were given a few drops of a mixture of twenty-four hour broth cultures of *Salmonella pullora*, strains Nos. 1911 and 1936. One cubic centimeter of filtrate A, already described, was given to nine chicks by means of a pipette. These were marked on the head with a touch of fuchsin and all were placed together under excellent conditions. A commercial chick starter was fed, commencing after the chicks were forty-eight hours old. Two control chicks died March 29th. The infecting organism was recovered from one but not from the other. Another control died March 30th. Three controls and one bacteriophage chick died next day. Five bacteriophage chicks died April 1st. The remainder died during the next two days. *Salmonella pullora* was recovered from all except the one referred to above. While it looked at first as if there might be some protection, all the chicks died eventually, showing that this race of bacteriophage in the dose employed was not of value in protecting against the infecting dose of *Salmonella pullora* used in this experiment.

Artificial Infection.—On April 20th, twenty-one chicks, twenty-four hours old, were infected with the same strains as in previous experiment. Of these

chicks, nine received 1 c.c. of filtrate by mouth, five were given 1 c.c. subcutaneously, and seven culture only. The filtrate employed was B, which is referred to under No. 829. The first to die was a bacteriophage chick on April 23rd. All the control chicks were dead by April 27th, while two bacteriophage chicks (one injected and one fed) remained alive. *Salmonella pullora* was recovered from all the dead chicks. On April 28th, about 2 grammes of feces of the two living chicks were planted in 50 c.c. of broth and incubated overnight. The filtrate was planted in quantities of one drop, ten drops, and 2 c.c. in 10 c.c. of bacterial suspension. The following morning the fed chick tubes were all clear, while there was slight cloudiness in the one drop injected chick tube. The fed chick tubes remained clear until May 12th when they were filtered and used in a chick protection experiment (Filtrate B1). As they had not shown any growth after two weeks' incubation they could possibly be considered as permanently sterile. The droppings of these two chicks were examined again on May 13th. There was then no evidence of dissolution and cultures on agar gave normal growth. Two out of fourteen bacteriophage chicks survived in this experiment while the seven controls died. In the next experiment it will be observed that a control chick survived so that such a small difference as was obtained here cannot be regarded as other than a natural happening.

Failure to Produce Infection by Natural Exposure.—On May 1st, twenty chicks, twenty-four hours old were placed in the same place where the chicks in the last experiment had died. Half were given 1 c.c. of filtrate B by mouth. On May 4th a control chick died, and another on May 9th. *Salmonella pullora* was not recovered from either bird. The other chicks remained healthy. On May 10th the droppings of a bacteriophage and a control chick were planted in broth, incubated overnight and filtered. Ten drops of each were planted in 50 c.c. of broth. The following day the bacteriophage chick tube was almost clear while the control chick tube gave normal growth. Nothing could be deduced from this experiment regarding the protective power of the filtrate as the chicks were not infected by exposure in a small incubator where other chicks had recently died from bacillary white diarrhea. Such an occurrence is sometimes observed in connection with chick raising, namely, that a healthy lot of chicks may be raised in quarters where the previous lot have died from this infection and where no disinfection has been practised. Presumably it is due to the state of resistance of the body. The chicks were young enough to be readily infected artificially as shown by the other experiments.

Artificial Infection.—On May 13th twenty chicks, not twenty-four hours old, were given one drop of broth culture as used in the other experiments. Ten of these birds were given 1 c.c. of filtrate B1 by mouth. This was obtained from the feces of a chick in a previous experiment by passage of filtrate B and was considered to be permanently sterile. One chick died immediately after the filtrate was administered. This was the only chick lost in this way in spite of the comparatively large dose which was given. A test of the filtrate made at this time with one drop, ten drops, and 2 c.c. showed that the suspensions became and remained clear for the two weeks they were held and plates made from them remained sterile. The chicks all remained well until May 18th. The lamp went out during the previous night and the chicks in the morning were huddled up and obviously ill. One control died. The next day two controls and two bacteriophage chicks died, and on May 20th three controls and one bacteriophage chick. On May 21st one control and two bacteriophage chicks died, a control next day and a bacteriophage chick the day after. Another

bacteriophage chick died May 26th and a control on June 2nd. Of these birds two bacteriophage chicks and one control survived, showing a lack of protective power in this filtrate. *Salmonella pullora* was recovered from all except one bacteriophage chick. The cultures from this bird were overgrown with spore formers so that the presence or absence of the infecting agent could not be determined. Droppings of the three survivors were tested on June 4th. Dissolution of the suspension occurred in the tubes with ten drops and 2 c.c. but not in the one-drop tube of one of the bacteriophage chicks. There was no evidence of dissolution in the tubes from the other bacteriophage chick or the control.

Artificial Infection and Repeated Doses of Bacteriophage.—On May 28th twelve chicks, twenty-four hours old, were given one drop of strain No. 1911 and 1 c.c. of filtrate B1 by mouth, as used in previous experiment. Eleven chicks were given the infecting agent only. The dose of filtrate was repeated daily on the twelve chicks until June 1st, making five doses. One control chick died May 31st and five the next day. On June 2nd two controls and four bacteriophage chicks died, and next day one control and three bacteriophage chicks. The last controls and three bacteriophage chicks died June 4th, leaving two bacteriophage chicks alive. One died next day. Complete dissolution of the bacterial suspension was produced by one drop of filtrate from droppings of this bird. The last died June 7th. The bacteriophage was also present in the feces of this bird after death and produced dissolution in 10 c.c. of suspension up to one-hundredth of a cubic centimeter but not above. *Salmonella pullora* was recovered from all these chicks. In this experiment five doses of the filtrate employed did not afford any protection against the infective dose employed. There was a slight delay in the appearance of symptoms in those chicks receiving the bacteriophage.

Natural Infection.—A flock of 400 chicks, seven days old. Diagnosis of bacillary white diarrhea established by bacteriological examination. One hundred and seventy were given 1 c.c. of filtrate D by mouth and the remainder were left as controls. This filtrate was obtained by transfers of C which had been isolated after passage through a chick. The owner had been losing two to three dozen chicks a day. Losses in all the chicks dropped off at this time, as is not infrequently observed in outbreaks. Twenty-two controls and forty-seven bacteriophage chicks subsequently died. There was no evidence of any protection in this experiment, the number of treated birds dying being more than double the number of controls. The bacteriophage used was of high (+++) but not extreme (++++) virulence.

Artificial Infection and Varying Doses of Bacteriophage.—On October 19th seventy-nine chicks, twenty-four hours old, were given one drop of broth culture of strain No. 1911, and varying doses of a bacteriophage of high virulence (+++). Tubes cleared up to 10^{-8} but secondary cultures occurred. Plating gave a count of 200,000,000 corpuscles per c.c. The bacteriophage was diluted to bring the required dose in 0.5 c.c. Following is dosage and number of chicks employed:

Lot 1.	16 chicks	were given	0.01 c.c. subcutaneously.
" 2.	16 "	" "	0.1 c.c. "
" 3.	16 "	" "	0.5 c.c. "
" 4.	15 "	" "	0.1 c.c. per orum.
Controls	16 "	" "	infecting suspension only.

Table 4 shows in convenient form the chick mortality by days.

TABLE 4

	October											November		
Lot	20	22	23	24	25	26	27	28	29	30	31	3	5	
1	.....	.....	1	5	4	1	2	1	.....	.....	.....	.....	.....	.....
2	.....	.....	.....	3	2	3	3	2	.....	.....	1	.....	.....	.....
3	.....	.....	.....	2	3	2	2	2	1	2	.....	1	.....	.....
4	1	.....	1	6	4	.....	.....	.....	.....	.....	.....	1	.....	.....
Controls	.....	1	5	4	1	1	.....	1	1	.....	.....	.....	1	.....

Cultures were made from all chicks and *Salmonella pullora* was recovered from all except the two that died October 20th and 22nd. At the conclusion of the experiment one control was alive, two of Lot 1, two of Lot 2, one of Lot 3 and two of Lot 4. The birds were observed until November 20th. On November 6th droppings from the control chick and one of Lot 3 were examined for the presence of a bacteriophage. That recovered from the control chick dissolved the bacterial suspension up to the third tube (10^{-3}). Secondary growth occurred. Seven plaques were present on the first plate and the others all had an even layer of bacterial growth. That from the chick from Lot 3 was not much stronger, temporary dissolution occurring up to 10^{-5} and twenty-five plaques being counted on the second plate.

Artificial Infection and Race G. Bacteriophage.—As a number of chicks were available for further experiment, a last experiment was tried with race G and the culture previously used, No. 1911. The bacteriophage was of high virulence (+++). Tubes became clear up to 10^{-10}, though secondary growth occurred in nine days in all tubes. The original suspension contained 5,000,000,000 corpuscles per c.c. Sixty chicks were employed in this experiment which was commenced November 13th. Fifty-five were given one drop of broth culture of No. 1911 by mouth. Of these, ten were given 1 c.c. of bacteriophage and twenty-five 0.5 c.c. of bacteriophage subcutaneously, while twenty were left as controls. In addition, five chicks that had not been given either infecting agent or bacteriophage were placed with the others. Mortality is shown in Table 5.

TABLE 5

	November						
	17	18	19	20	21	22	23
Infection only	3	7	2	2	.....	1	.....
No infection	.....	.....	.....	.....	.....	.....	.....
Infection + 1 c.c.G.	1	3	.....	.....	.....	1	1
Infection + 0.5 c.c.G.	.....	7	4	4	1	.....	2

Cultures were made from the dead chicks and *Salmonella pullora* was recovered from all. No chicks died after the tenth day, at which time twenty-five per cent. of the controls were alive, forty per cent. of the chicks receiving 1 c.c. and twenty-eight per cent. of the chicks receiving 0.5 cer pent. of bacteriophage. While forty per cent. of the chicks receiving the larger dose survived, they were the smallest group and in any event there was only a small difference. The five chicks that received neither culture nor bacteriophage remained healthy, though in heavily infected quarters.

Titrations.—D'Herelle, in "The Bacteriophage and Its Behaviour," states that for accuracy the method that should be employed in the titration of a bacteriophage is the spreading on agar slants or plates of a definite quantity of a suspension of the susceptible bacterium inoculated with a dilution of the bacteriophage of such a titre that, after incubation, the plaques are isolated and can be counted and the number of corpuscles in the original suspension arrived at.

As an alternative, when results of greatest accuracy are not required, he suggests the following system:

0 = No virulence towards a given bacterium. Normal cultures of the bacterium develop in bouillon or on agar whatever the quantity of filtrate from the feces that has been added.

\+ = Weak virulence. The growth in bouillon of the bacterium to which the filtrate has been added is apparently normal. Transfer of this culture to agar gives, after incubation, a culture layer showing a few minute plaques. Some of the bacteriophagous corpuscles have therefore attacked the bacteria and have formed colonies.

\+ + = Medium virulence. The culture of the bacterium to which the filtrate has been added is almost normal in bouillon. Transfers of this culture to agar give, after incubation, either a layer of the bacterium studded with very numerous colonies of the bacteriophage, presenting an appreciable surface area, or of fragments of bacterial culture because of the very great number of bacteriophage colonies.

\+ + + = High virulence. Dissolution of a bacterial suspension is obtained but secondary cultures constantly develop. The reinoculations on to agar remain sterile or give only rare colonies of the bacterium.

\+ + + + = Extreme virulence. The bouillon suspension shows complete, and, in general, permanent dissolution. Inoculations on to agar always remain sterile.

In the same book d'Herelle states that an extremely active bacteriophage is one that is capable of completely and permanently dissolving all of the bacteria present in a medium, even though only an infinitely small quantity of the filtrate containing the bacteriophage principle (a millionth of a cubic centimeter, or less) is introduced into a definitely turbid suspension of the bacteria.

The first method of titration was unfortunately not employed with race D. Another race (E), having less power of bacteriophagy, was titrated by this method. Dilutions were made up to 10^{-12}. Four and one-half cubic centimeters of suspension of No. 1911 containing approximately 100,000 bacteria per c.c. were placed in each of twelve tubes. To the first was added 0.5 c.c. of race E. This tube was shaken, 0.5 c.c. was transferred to the next tube, and 0.05 to an agar plate and spread over the surface with a sterile glass rod. Plating was carried out up to 10^{-10}. Plates were incubated at room temperature and tubes at 32° C. The following morning the tubes were nearly clear up to 10^{-8} and remained so for about two days, when they again became cloudy. They never became completely dissolved. Following are results of plating:

Plating of dilutions 10^{-1} to 10^{-3}, discrete growth of scattered colonies.

Plating of dilution 10^{-4}, layer of bacterial growth broken up by numerous plaques and also large clear areas with scattering of colonies as in previous tubes.

Plating of dilution 10^{-5}, numerous plaques in bacterial layer. A large clear area in plate in which scattered colonies occurred.

Plating of dilution 10^{-6}, ten plaques in a smooth bacterial layer. Diameter from 5 to 7 mm.

Plating of dilution 10^{-7}, one distinct plaque in smooth bacterial layer.

Plating of dilutions 10^{-8} to 10^{-10}, smooth bacterial layer as on control plate.

Taking 10^{-6} as the most suitable plate for counting, 0.05 c.c. contained ten corpuscles therefore 1 c.c. would contain twenty times that number or 200. That multiplied by 10^{-6} would give 200,000,000 per c.c. in the original suspension.

Another bacteriophage (F), isolated from the ovary of a hen, caused clearing up to 10^{-8}. Secondary growth occurred.

Plating of dilutions 10^{-1} and 10^{-2} gave no growth.

Plating of dilution 10^{-3}, a very few scattered colonies.

Plating of dilution 10^{-4}, scattered colonies, scarcely more than 10^{-3}.

Plating of dilution of 10^{-5}, a number of large confluent plaques, many large clear areas and some scattered colonies.

Plating of dilution of 10^{-6}, smooth layer of bacterial growth, eight plaques.

Plating of dilutions 10^{-7} to 10^{-10}. Smooth growth, no plaques.

This would indicate that the original suspension contained 160,000,000 corpuscles.

Results of titration of another five races of bacteriophage are as follow:

G. Isolated from ovary. Tubes clear up to 10^{-11} but secondary growth occurred in nine days. Five billion corpuscles per c.c.

H. Isolated from droppings of chick. Partial clearing up to 10^{-5}. Original suspension had 50,000 corpuscles per c.c.

I. Isolated from droppings of chick. Clear up to 10^{-3}. Secondary growth. Seven plaques on first plate, that is, 140 per c.c. in original suspension.

J. Isolated from ovary. Almost clear up to 10^{-10}. Never became quite clear. Original suspension contained four billion corpuscles per c.c.

K. Isolated from ovary. Almost clear up to 10^{-9}. Never quite clear. Original suspension contained 1,400,000,000 corpuscles per c.c.

All the plaques observed in the foregoing titrations were from 5 to 8 mm. in diamteer, except where several had run together.

By the second method race D could be described as +++. When compared by the third method complete dissolution was produced by the addition of 10^{-11} cubic centimeter (one hundred-billionth part of a cubic centimeter). When the clear tubes were plated on agar a few scattered colonies developed in some cases while in others the plates remained sterile. After a period of from three to eight days more or less cloudiness again developed in the clear tubes.

The Pullora-bacteriophage (D) used in the natural infection experiment could evidently be considered as of high (+++) but not extreme (++++) virulence, according to two of the foregoing titrations.

Bacteriophage from Abscess in Rabbit.—About 5 grammes of pus from an abscess, produced in course of injecting a rabbit for anti-pullora serum, was planted in 50 c.c. of broth and incubated overnight. The filtrate was diluted in tubes of 10 c.c. of broth suspension of *Salmonella pullora* up to 10^{-7}. The 10^{-1} and 10^{-2} tubes became clear next day but there was no observable dissolution in the others. The following day secondary growth occurred in the clear tubes.

Summary

1. Races of Pullora-bacteriophagé were isolated from the ovaries of eight infected hens. In every case where *Salmonella pullora* was present a bacteriophage was also isolated.

2. These races varied in strength. Those isolated towards the end of the experiment were titrated by the method advocated by d'Herelle. One series of tubes prepared from the feces of a chick that had previously been given a dose of

bacteriophage remained sterile for two weeks at which time they were accidentally discarded. They were possibly permanently sterile. No race was isolated that could be considered as being of extreme (++++) virulence by d'Herelle's method but nearly all were of high (+++) virulence.

3. A bacteriophage was present in the feces of a goose that had died of goose septicemia (*Pasteurella avicida* infection). It was not strong.

4. In the only instance in which chicken feces were examined for a colon-bacteriophage there was no evidence of bacteriophagy in broth or on agar plates.

5. Experiments were carried out to test the protective power of various races of Pullora-bacteriophage in one natural and several cases of artificial infection. In some cases there appeared to be a delay in appearance of symptoms, but in no case was there any definite evidence of protection. The races employed were of high (+++) but not extreme (++++) virulence.

6. Two unsuccessful attempts were made to produce natural infection with *Salmonella pullora* by placing chicks in quarters in which artificially infected chicks had died.

7. A weak Pullora-bacteriophage was obtained from pus from an abscess in a rabbit injected with *Salmonella pullora*.

SOME EXPERIMENTS ON THE DISINFECTION OF EGGS AND INCUBATORS

Ronald Gwatkin, D.V.Sc.

It is a custom with some poultrymen to dip eggs in methyl hydrate with the object of disinfecting the shell. It did not appear probable that the immersion of a number of eggs in a wire basket in methyl hydrate for a few seconds would destroy the bacteria upon them, and a series of experiments was tried to test out the efficacy of this method. The writer is indebted to Messrs. R. G. Chapman and J. C. Bankier for assistance at various times with this work, and also to Professor Marcellus and Mr. E. S. Snyder of the Poultry Department, O.A.C., for their co-operation.

Dipping Whole Eggs.—In the preliminary experiment eight eggs were used as follows: Four were dipped in a suspension of *Pasteurella avicida* and allowed to dry overnight at room temperature. Next day two of these were dipped in methyl hydrate for fifteen seconds while the other two were kept as controls. Of the other four eggs, two were dipped in methyl hydrate for thirty seconds and two were not dipped. Each egg was placed in forty cubic centimeters of sterile water in sterile aluminum jelly moulds and turned over with sterile wood applicators for one minute. One cubic centimeter of water was then plated in beef infusion agar with a pH reaction of 7.8. After seventy-two hours' incubation at 37° C. it was found that very few colonies had developed on the plates from both dipped and undipped eggs, and in the case of those infected with *Pasteurella avicida* no colonies of that organism developed on the plates from the undipped eggs. From this it was evident that the method was not suitable as the bacteria appeared to adhere strongly to the shell. The following experiment was carried out to make sure that drying over night had not destroyed the bacteria.

Resistance of Pasteurella avicida to Drying.—Pieces of sterilized shell were dipped in a suspension of *Pasteurella avicida* and allowed to dry in sterile petri dishes with the lids slightly raised. These were kept in a locker at room tempera-

ture. A piece of shell was planted at this time hours and every twenty-four thereafter in beef extract broth.

Growth took place up to the fourteenth day at which time the experiment was discontinued as insufficient infected shell had been prepared.

Resistance of Pasteurella avicida on Pieces of Shell to Methyl Hydrate.—Pieces of sterilized shell dipped in *Pasteurella avicida* and dried at room temperature for fifteen hours were dipped in methyl hydrate for five, ten, fifteen, and thirty seconds. A piece of undipped shell was planted as a positive control. Double the quantity of methyl hydrate usually carried across with the shell was placed in another broth tube seeded with the same culture, as a control on any inhibitory action of the methyl hydrate. Growth occurred equally well with all pieces of shell and in the methyl hydrate tube.

The same experiment was then repeated with shell that was just dry after dipping in *Pasteurella avicida* suspension. Results were the same, growth occurring equally well from all shell cultures.

In the next experiment, to avoid any protection that might be afforded the organism by the membrane on the inner surface, sterile pieces of shell were infected by placing a loopful of *Pasteurella avicida* suspension (2 c.c. saline to one slant) on the outside of the shell. After drying four hours the shell was placed in methyl hydrate for periods ranging from five seconds to fifteen minutes. Controls were made from undipped, infected and sterile shell. Growth of *Pasteurella avicida* occurred in all tubes except the sterility control.

The foregoing experiment was repeated, ranging from fifteen minutes to one hour by five minute intervals. Growth occurred up to twenty minutes, but all tubes above that remained sterile.

Resistance of Salmonella pullora to Drying.—Similar experiments were carried out with *Salmonella pullora*. Whole eggs were unsatisfactory for handling, so pieces of sterilized shell, from which the membrane had been stripped, were dipped in a suspension of *Salmonella pullora* and allowed to dry in sterile petri dishes. One lot was kept in the incubator at 37°C. and the other at room temperature in a dark locker. A piece of shell from each lot was planted as soon as dry and every day thereafter. Growth continued until the twelfth day in the incubator-stored pieces of shell, though noticeably slower at the seventh day, but cultures made for five days after that were negative. All tubes were incubated at least five days. Growth still occurred from the pieces of shell stored at room temperature at forty-four days at which time the supply of shell ran out. It had been noticeably slower and weaker after about the eighteenth day.

Resistance of Salmonella pullora to Methyl Hydrate.—Pieces of sterilized shell were infected with a loop on the outer surface to avoid getting any bacteria under the membrane. These were handled as in the previous dipping experiments.

It was found, as with *Pasteurella avicida*, that immersion in methyl hydrate up to one minute had no effect. Shell was then dipped at intervals up to fifteen minutes. Growth occurred at seven, but not at ten nor fifteen minutes. In view of these results, which were afterwards upset, eggs for setting were dipped for thirty seconds, and one, two, five, seven and ten minutes. One lot was left undipped. Eighteen eggs were used for each lot. The same thing was done in another incubator so as to have duplicate lots, making thirty-six eggs for each dipping and for controls. Hatching results are shown in table 6.

TABLE 6

Length of Dipping	Number Set	Infertile	Dead Germs
5 seconds	36	10	1
30 "	36	7	2
1 minute	36	2	2
2 minutes	36	11	2
5 "	36	8	3
7 "	36	9	1
10 "	36	9	1
Controls	36	16	1

While this was a poor lot of eggs it will be noticed that the dipped eggs were as good or better than the controls, indicating that dipping for ten minutes did not lower the hatchability.

Further Tests on Resistance of Salmonella pullora to Methyl Hydrate.—Further dipping was carried out with the same culture from nine to thirty minutes at one minute intervals, and it was found that growth occurred in all tubes, that is, up to thirty minutes. The growth in these tubes was checked by plating and found to be pure. Several other tests were made and the same inconsistency was found, as is shown by the following examples.

Shell was treated as previously outlined and dipped from twenty to sixty minutes at five minute intervals. Growth occurred in the twenty, forty-five and fifty-five minute tubes, but not in the others, though cultures were incubated for five days. The tubes in which there was growth were plated and shown to be pure. The next test was made in exactly the same way with the same culture, and in this case no growth occurred in any of the tubes from twenty to sixty minutes. Another test was made from one to twenty minutes and growth occurred in all except the two and fifteen minute tubes. The highest ones, namely, the seventeen and twenty minute tubes and the positive control gave pure growth of *Salmonella pullora* on plating. The next test gave growth in the five minute tube, but not in the ten nor above, as in the first experiment.

Every effort had been made to keep the infecting suspension as nearly as possible the same strength and always a twenty-four-hour growth of the same culture, which was applied with the same loop. In spite of this the resistance was markedly variable, this culture resisting from five to fifty-five minutes in the same strength methyl hydrate. In no case, however, was the organism destroyed by the few seconds dipping which would ordinarily be used.

Comparison of 95 per cent. and 80 per cent. Methyl Hydrate.—Samples of infected shell were dipped in 95 per cent. and 80 per cent. methyl hydrate for the same periods, namely, from one to twenty minutes by intervals of one minute. No growth occurred in the 80 per cent. pieces while growth was present in all tubes of the 95 per cent. set, except the two and fifteen minute tubes.

This was repeated with 95 per cent. and 80 per cent. methyl hydrate at intervals of five, ten, twenty-five and forty seconds, and one to five minutes by intervals of one minute, and then up to sixty minutes by five minute intervals. Growth in the 80 per cent. series occurred up to four minutes and in the 95 per cent. series up to five minutes, omitting the four minute tube, in which there was no growth.

In the first instance there appeared to be a marked difference but the second time it was negligible, and in view of the erratic manner in which growth took place in the previous experiments no comparison could be drawn.

Effect of Strength of Infecting Suspension on Results.—In order to discover whether or not the variable results were due to the use of varying quantities of the infecting agent, this was made up in the ordinary way and then a portion of it diluted to one-tenth by the addition of sterile saline solution. Suspension A was made by washing off the growth on a slant of *Salmonella pullora* with two cubic centimeters of salt solution. Suspension B was one part of A and nine parts of salt solution. Pieces of sterile shell were infected by placing on them one loopful of the suspension. When dry, they were dipped in 95 per cent. methyl hydrate for periods of from ten seconds to one hour and then planted in broth. Pieces of undipped, infected shell and sterile shell were planted as controls. Table 7 shows results after incubation for seven days at 37°C.

TABLE 7

	Seconds			Minutes																	
	10	30	45	1	2	3	4	5	10	15	20	25	30	35	40	45	50	55	60	N/Con.	P/Con.
A	+	+	+	+	+	+	+	+	+	+	—	+	+	—	—	—	—	—	—	—	+
B	+	+	+	+	+	+	+	+	+	+	—	—	—	+	—	—	—	—	—	—	+

The weaker suspension gave growth one tube higher than the stronger, which would seem to indicate that the irregularities observed were probably not due to the quantity of the infecting agent employed. The thirty and thirty-five minute tubes were plated and gave pure culture of *Salmonella pullora*.

Resistance of Salmonella pullora to Chloride of Lime Solution.—As chloride of lime solution has been used for disinfecting incubators, both empty and containing eggs, it was decided to test its efficacy in destroying *Salmonella pullora* on egg shell. The same procedure was followed as in the methyl hydrate dipping. The solution used was 1.20 grammes per pint (sixteen ounces) which is slightly stronger than one pound per fifty gallons. Sterilized shell was infected and dried. One piece was planted as a positive control and a piece of sterile shell was also placed in broth. Shells were placed in this solution without touching and transferred to broth tubes at varying intervals of from ten seconds to sixty minutes. Normal growth occurred in positive control and none in sterile shell control. Growth of *Salmonella pullora* was present in all tubes up to thirty minutes. No growth took place in forty-five and sixty minute tubes.

DISINFECTION OF INCUBATORS WITH FORMALDEHYDE.

Hinshaw, Upp and Moore (Jour. A.V.M.A., Feb. 1926) point out that a search of the literature revealed no articles dealing with experiments in transmissability of bacillary white diarrhea in the incubator. They found that the infection could be disseminated by artificially infected chick-down, placed in a forced-air-draught-type incubator.

Weaver (Report Vet. Director Gen. for 1926) states that their work has given direct evidence of the spread of infection to normal chicks from healthy stock during incubation, by means of a contaminated incubator from infected eggs and the resulting chicks. The eggs were confined to separate trays, but the machine was of the fan-system air-circulation type.

Field observations would also indicate that such infection does indeed take place and that disinfection of incubators is a necessary procedure. Some types

of machine can be readily disinfected with solutions, but in other types where chick-down circulates it cannot be reached by such means. It was therefore decided to try formaldehyde, which could penetrate to every part of the machine where the down could go. The following experiments were tried to test the efficacy of the disinfecting agent and also its effect on the eggs.

Disinfection by Exposure Overnight.—In the first instance pieces of shell were hung up in an autoclave and sterilized. When cooled down to room temperature they were dipped in suspensions of *Pasteurella avicida* and *Salmonella pullora* and allowed to dry. Control pieces were planted at this time. The formalin permanganate method (Stitt, Practical Bacteriology and Animal Parasitology) was used for generating formaldehyde. In employing this method a pan is partly filled with water. A metal or glass receptacle containing the potassium permanganate is placed in the centre and the formalin is poured on the crystals. Gas is rapidly generated. The container should be large enough to prevent the mixture foaming over the sides. Five hundred cubic centimeters of formalin and two hundred and fifty grammes of potassium permanganate for each thousand cubic feet is employed. Cracks and openings must be carefully closed. With the incubators used in the following experiments no precautions were taken other than closing the ventilators, as the doors appeared to shut reasonably tightly.

The capacity of the chamber used in this experiment was about five cubic feet. Two and one-half cubic centimeters of formalin was poured on one and one-quarter grammes of potassium permanganate and the door was closed. The following morning the exposed pieces of shell were planted in tubes of broth and incubated. Normal growth occurred from the controls. None from the exposed shell.

Exposure for Periods of One and Two Hours.—Three experiments were carried out as above except that exposure was made for periods of one and two hours. Exposure for one hour destroyed *Salmonella pullora* but not *Pasteurella avicida*. In two hours both cultures were killed. Normal growth occurred in controls. The two hour exposure was repeated with the infected shell placed under a layer of fine shavings about one-half inch in depth. No growth occurred though cultures were incubated for a week. Controls gave normal growth.

Disinfection of Incubator Containing Eggs.—In certain commercial incubators difficulty in disinfecting arises from the fact that the incubators are never empty throughout the hatching season, eggs being placed in as soon as chicks are removed, after a more or less thorough attempt at disinfection. In view of this it was decided to try and disinfect incubators containing eggs. A bacteriological incubator was first used with a capacity of about five cubic feet, so the same dose of formalin and potassium permanganate was used as in the previous experiment. Ten eggs were placed in the incubator and pieces of infected shell exposed. After two hours the exposed portions of shell were planted in broth and incubated. No growth took place but normal growth took place from the unexposed shell controls. Nine eggs were then placed in the incubator as controls. The gassing process was repeated each week and controls regularly made. The control eggs were removed to another incubator during the exposure. The fourth and last exposure was made on the twentieth day. At this time one chick had broken the shell. This chick was submitted to the gas with the other eggs for two hours without apparent harm. Table 8 gives results of hatch, in which it will be seen that the exposed eggs were apparently not harmed, giving a much better hatch than the controls.

TABLE 8

	Number of Eggs	Infertile	Dead Germs
Controls	9	2	4 (about 10 days)
Exposed	10	1	2 (about 14-18 days)

Disinfection of Commercial Incubator Containing Eggs.—A six hundred egg hot water incubator with outside measurement of four feet seven inches, by four feet two inches, by eleven and one-half inches was employed. The inside measurement was accepted as being about the same for practical purposes, as it was simply less the lumber and supports. Two trays of eggs were used, with seventy-five in each. Five grammes of potassium permanganate and ten cubic centimeters of formalin were used to generate formaldehyde. Two pieces of shell were infected with *Salmonella pullora* and placed under one-half inch of fine shavings. After two hours the exposed and unexposed pieces of shell were planted in broth tubes. No growth occurred from exposed shell but normal growth took place from the control. This was repeated three times a week. After the second exposure the tubes containing exposed shell gave growth so the quantity of formalin was increased to fifteen cubic centimeters. The eggs were given in all ten exposures. In three instances one piece of shell was not sterilized, and in one instance both pieces gave growth, so that actually these eggs were exposed six times to a sufficient concentration of formaldehyde to destroy *Salmonella pullora* on both pieces of shell, and also four times to a concentration almost as great. It is interesting to note that the shell under the shavings was always sterilized, except in the one instance, the shavings apparently retaining the gas in contact with the shell. The shavings were dry when used though they had been autoclaved. Apparently the failure to sterilize the exposed pieces of shell was due to leakage of the formaldehyde from the incubator. The doors were not pasted up but the ventilating holes were closed. Table 9 gives the hatching results of this experiment:

TABLE 9

	Eggs Set	Infertile	Dead Germs		Hatched
			1st test	2nd test	
Controls	75	19	6	13	37
Exposed	75	21	5	14	35

From the above it will be seen that apparently no harm was done to these eggs during the hatching by the exposure to formaldehyde, which on six occasions was of sufficient strength to kill the bacteria on the test shells.

After the chicks were removed thirty cubic centimeters of formalin and ten grammes of potassium permanganate was tried as the disinfecting dose. Infected pieces of shell, covered with shavings and resting on top of them, were exposed for one hour. The shell was planted in broth as previously. Controls on unexposed shell were also made. This was repeated three times. The covered

and uncovered pieces of shell were sterilized in each case and controls gave normal growth, indicating that one hour exposure with this dose would be satisfactory in this incubator, provided that it was not too strong.

In order to discover whether a very strong concentration would be injurious this same dose was used in the original five cubic feet incubator for one hour exposures on twenty-five eggs. The same number were kept as controls and removed to another incubator during the gassing. Shell was regularly sterilized by the action of the gas, even under one-half inch of sand. Unfortunately the eggs proved to be nearly all infertile so that nothing was learned regarding the effect on the eggs of this very heavy concentration of formaldehyde.

Disinfection of Same Incubator Used in Last Experiment with Double Quantity of Formalin and Potassium Permanganate for One Hour.—The six hundred egg incubator used in the previous experiment was employed. One hundred and fifty-two eggs were set in two trays. Ten grammes of potassium permanganate and thirty cubic centimeters of formalin were used to generate formaldehyde and exposure was for one hour. The infected shell was exposed as in the last experiment and controls also planted. After the first exposure to formaldehyde, growth occurred from the exposed shell. On plating it was shown to be *Salmonella pullora*. The incubator was sealed with strips of gummed paper during the eight subsequent exposures and each time the infected shell was sterilized, while the control gave normal growth. The control eggs were placed in another incubator during the gassing process. Eggs were tested on the eighth and fourteenth days. Table 10 gives hatching results in this experiment:

TABLE 10

	Eggs Set	Infertile	Dead Germs		Hatching		
			1st test	2nd test	Pips	Fully Formed	Hatched
Controls......	77	26	4	3	2	4	38
Exposed......	75	19	3	3	2	4	44

From the above it will be seen that after eight exposures of one hour to formaldehyde of sufficient intensity to sterilize the exposed shell in a sealed incubator and one exposure of less concentration, 74 per cent. of the fertile control eggs and 78 per cent. of the fertile exposed eggs hatched. One of the controls was a cripple. The other chicks were healthy and there was no difference between either lot.

Summary.—Whole eggs were not found to be satisfactory for experiments in dipping.

Pasteurella avicida on egg shell was not destroyed by immersion in 95 per cent. methyl hydrate for twenty minutes.

Salmonella pullora on egg shell resisted the action of 95 per cent. methyl hydrate for from five to fifty-five minutes. In no case, however, was the organism destroyed by the few seconds dipping ordinarily employed. The irregular results observed with the same culture did not appear to be due to the strength of the infecting suspension. The same organism resisted dipping in freshly made solution of chloride of lime, of a strength of about one pound to fifty gallons of water.

Pasteurella avicida resisted drying in the dark at room temperature for the fourteen days it was tested.

Salmonella pullora resisted drying on shell in the dark at 37°C. for twelve days, after which time no growth occurred. Infected pieces of shell stored in the dark at room temperature gave growth up to forty-four days, at which time the supply of shell gave out.

An incubator, four feet seven inches by four feet two inches by eleven and one-half inches, containing eggs, was satisfactorily disinfected with formaldehyde on one occasion six, and on another eight times, during hatching, without doing any apparent harm to the hatch. Thirty cubic centimeters of formalin and ten grammes of potassium permanganate were used to generate the gas. Disinfection was checked by exposing pieces of infected shell in the incubator. It was found necessary to seal the doors to prevent escape of gas.

DEPARTMENT OF PATHOLOGY AND PARASITOLOGY

The activities of the department can be considered best under the following headings—tutorial, routine, research, and investigatory. Such a division is purely arbitrary and is adopted for purposes of simplicity in making this report.

Tutorial.—During recent years no important changes have been introduced into either the class lectures or the laboratory work. In the course of lectures in pathology great care is taken to explain to the student the nature and meaning of the changes that are seen in the animal body when it is the subject of disease. The student is taught to look for the operation of fundamental biological principles and learn to relate his observations to such, rather than memorize a mass of unrelated detail. Much ready-made knowledge has to be imparted yet whenever possible the student is stimulated to think things out for himself.

The laboratory work improves year by year with the increase in the number of specimens of diseased tissues and animal parasites which are so necessary to illustrate the subjects discussed in the lectures.

Routine.—The major part of the work of the laboratory consists in the microscopical examination of diseased tissues. This is in order to either establish or confirm a diagnosis. The value of such work to the clinician has been demonstrated repeatedly during the year.

The interest of fox breeders in parasitic diseases continues to increase with the ever-growing knowledge of the serious effects of parasitic infestation on the general condition of the fox. This has resulted in the examination of a large number of feces for intestinal parasites, as well as many post-mortem examinations where the cause of death has been obscure.

The variety and number of pathological tissues examined during the year is recorded in a synoptic table to which the reader is referred. It is gratifying to note that the majority of specimens now received are properly preserved, which greatly enhances the possibility of making a correct diagnosis. Brief reports on a few of the most interesting specimens have been prepared and are included among the appendices.

The college has continued to prepare and distribute both a vaccine and a bacterin for use in the control and prevention of contagious abortion in cattle. During the past year 2,848 doses of vaccine and 3,917 of bacterin have been supplied to provincial veterinarians. Opinion differs as to the value of the

treatments. Up to the present we have received little adverse criticism, the great majority of those who have used the vaccine and bacterin, along with hygienic measures, having been well satisfied, believing that it has been definitely beneficial.

During the year 453 samples of blood were tested for evidence of contagious abortion. Of this number 134 were found to be positive, 294 negative and twenty suspicious. Five were hemolysed. This work is entirely in the hands of Miss Le Grand, who has kindly continued to make the tests for our department.

VETERINARY SCIENCE IN JAPAN.

FRANK SCHOFIELD, D.V.Sc.

During the summer of 1926 the writer, while travelling in Japan, visited both the Veterinary Department of the Imperial University and the Veterinary Laboratory of the Department of Agriculture, with the object of determining the nature of the work being carried on in these institutions. Due to the courtesy of those in charge much interesting information was obtained which, together with other relative facts, is presented in this paper.

Veterinary Education in Japan.—At the period of the Restoration, 1868, veterinary science, along with the other sciences, was brought to Japan with the introduction of Western civilization. In 1877 a Veterinary Department was created within the Faculty of Agriculture of the Tokyo Imperial University. To-day there are twenty educational institutions giving courses in veterinary science from which have graduated almost ten thousand veterinary surgeons. There is a marked difference in the academic status of these schools. The highest grade is represented by the Veterinary Departments of the Imperial Universities, of which there are two. Here Veterinary Science is considered as a special department in the Faculty of Agriculture. The regular course of study extends over a period of three academic years of seven months each. The entrance requirements for students are about equivalent to junior matriculation. The student enrollment is usually small, twenty to thirty men in all the years. The student fees are small, being less than $20.00 per term. The salaries of professors vary according to rank, a full time professor of a major subject receiving from $2,500 to $3,400. These institutions are financed directly from the Imperial Government. Satisfactory students have little difficulty in securing government positions after graduation. Of the remaining schools, fourteen are connected with Agricultural Colleges as divisions of these institutions. The entrance requirements are low, instruction is poor, with the result that graduates are not well equipped to undertake their work. As well as these, there exist three private veterinary schools, having a large attendance and being well staffed, but the entrance requirements are low so that the quality of the students is usually poor.

This super-abundance of veterinary schools and colleges has its explanation in the Russo-Japanese war of 1904. Fighting had not continued for long before it was discovered that the available veterinary surgeons in Japan were quite inadequate in numbers for the heavy work which had to be done. To protect itself against such a serious defect in the future the War Department encouraged the formation of any kind of veterinary school. The regulations governing the establishment of schools were simplified and all graduates were granted a license

to practise. This has resulted in much hardship among the better qualified men, so to-day a strong attempt is being made to abolish most of the schools which are below the standard of the Imperial Universities.

Achievement of the Veterinary Profession.—Great credit must be given to the members of the profession in Japan for the courage and skill with which they have met many difficult situations. Western civilization came like a flood to Japan and with it western diseases. Many varieties of pure bred stock were hurriedly being imported by the Japanese government, and with the stock came diseases such as contagious pleuro-pneumonia, rinderpest and other conditions that were unknown in Japan. To-day there is a well-trained force of inspectors controlling up-to-date animal quarantine stations at the chief ports. Contagious pleuro-pneumonia has been eradicated by the drastic method of slaughter, and at the present time foot and mouth disease does not exist, while other epidemic diseases are at least being held in check. The difficulties in maintaining healthy herds of animals are unusually great, due to the proximity of Japan to China and Manchuria, where every kind of disease abounds unchecked. The progressive nature of the work undertaken by the government veterinarians is well reflected in the output of the Veterinary Laboratories. During the last year over four hnndred litres of anthrax serum, nearly three hundred litres of hog cholera serum, and over fifty thousand doses of rabies vaccine were prepared. Besides these, tens of thousands of doses of other sera, vaccines, bacterins, filtrates and tuberculins were made. The director, Dr. Nitta, has made extensive experiments with the most promising prophylactics for tuberculosis, and is at present testing the value of an attenuated culture of his own. In the direction of research the work of Dr. Tokoshige on epizootic lymphangitis is well known in the West. Much work has been done and some interesting discoveries have been made in connection with diseases which seem to be strictly confined to Japan.

Animal Diseases in Japan.—All of the epidemic diseases common to the West are known in Japan. They have either been imported directly from Europe by the introduction of pure-bred stock or have come via the Asiatic mainland. Possibly the most serious is rinderpest, which is constantly creeping in from China. Blackleg, anthrax and hog cholera are fairly common. It is of interest to note that at least one-third of the cases of anthrax occur in horses. Hydrophobia has decreased in a remarkable degree since the extensive use of the prophylactic vaccine. The commonest disease of the horse is strangles, for which both a vaccine and a serum is used extensively. Epizootic lymphangitis, which at one time was very common among the horses of Japan, has been almost entirely eradicated. A most serious condition in dogs is caused by a parasitic nematode, which lives in the heart and large blood vessels, the "*Filaria immitis.*" The parasite is transmitted by the mosquito and it is estimated that 85 per cent. of the dog population suffers from infestation.

Among dairy cattle, tuberculosis causes severe losses. The earliest tests which were made in 1900 revealed the fact that 34 per cent. of these animals were infected. Twenty-three years later the percentage had been reduced to 10.2 per cent. Tuberculosis is still a rare condition among the native animals, which live singly, and almost always in the open. They are not used for milk production, but share almost equally with the horse the heavy draft work of the country. Milk fever is quite common among the imported dairy cattle. Mange in all animals and of all varieties is frequently encountered. Parasitic diseases of sheep became so serious that the industry failed soon after its inception.

Veterinary Practice.—The profession of veterinary surgery and medicine is hardly to be coveted in Japan to-day. There are a few men with large city practices, but the majority are just able to make a living and nothing more. A large number of the graduates of the inferior schools carry on their veterinary practice as an accessory, making their living from some more regular and lucrative form of business. The fees are very low even when compared with the cost of living. A visit in the city will be made for fifty cents, while a trip to the country will only realize from $1.00 to $1.50. The usual fee for a major operation, such as neurectomy, is $5.00. There can be no improvement under the existing system of veterinary education. A bill which will result in the elimination of the inferior schools and colleges has already reached the Japanese Diet.

Live Stock in Japan.—Although Japan has a population of fifty-six millions of people, her animal population is less than 10 per cent. of that of Canada. The work of the veterinarian is therefore limited by the comparatively few animals owned by the farmers. Labor is cheap, the families are large and so most of the work is done by the peasants themselves. Another important factor is the small size of the farms. Fifty per cent. of the farms have an area of less than two and a half acres, which can be easily cultivated by manual labor. It is interesting to notice that there are more horned cattle used in farm work than horses.

Until recent years stock breeding has not prospered in Japan and chiefly for religious reasons. With the advent of Buddhism, strict edicts were promulgated against the slaughter of any animal. As early as 741 A.D. anyone killing a horse or an ox was flogged with one hundred strokes and heavily fined. For a while the important industry of fishing was ruined and the state had to provide rice for the fishermen who were not allowed any longer to catch and kill fish. Apart from religious reasons the use of flesh for food is very limited in Japan, also their customs do not require the important by-products of leather, hides, and bristles.

Horse Breeding.—The native horses of Japan are of poor quality, as little attention had been paid to breeding. The experience of the Japanese Government with their remounts during the Boxer War was very unfortunate. Their horses were not only of poor quality, but frequently so vicious that their management became a dangerous and difficult problem. Few of the horses had been castrated. Immediately following the war a law was enacted encouraging castration, which is done free, and offering a small grant of money if the animal should be disabled or die as a result of the operation. In addition to this a Horse Bureau was established with an endowment of $15,000,000 for the purpose of improving the native stock and to provide funds for importation. Thousands of foreign stallions have been imported and about 1,500 are kept constantly for service. Horse racing was encouraged and became very popular.

Sheep Raising.—There are no native breeds of sheep in Japan, so to provide the wool required with the adoption of Western civilization a large number of sheep were imported in the early eighties. The introduction of sheep was a costly failure as most of the animals died. At the time it was thought to be due to eating a coarse bamboo grass. Later investigation considers the loss to have been due to parasites, especially the "*Oesophagostoma columbiana.*" During the last war Japan encountered such difficulties in procuring wool that a further attempt at sheep raising was made. A special bill was passed by the parliament authorizing the purchase of 1,000 head of sheep from abroad each year. A small subsidy of $2.50 per head is granted to any farmer who raises

sheep. Most important, however, is the veterinary supervision of these sheep for the purpose of combating the parasites which caused the failure of the early experiments. At present all sick sheep are treated at government expense. The total number of sheep is about 10,000.

Cattle Breeding.—The native cattle were used almost exclusively as beasts of burden. As long ago as 645 A.D., a milk cow was presented to the court of Japan and from that time on milk was looked upon as a peculiarly valuable food. A century later a dairy herd was attached to the Court and its supervision was placed in the hands of the court physician. Butter was also made for the use of the courtiers. The dairy cattle of modern Japan are all of foreign importation. Holsteins and Ayrshires have so far proved to be most suitable for the climate. Milk cows number 50,272 and the average yield is about 3,500 lbs. per head per year. Dairying is really a new industry and at present dairy products are very limited. Most of the milk is used in the fresh state. Pasteurization is required of all milk offered for sale. The price is rather high, varying from twenty to twenty-five cents per pint.

Poultry.—While birds are seen around most farm houses, poultry has not as yet attained any particular development. The egg production is very low, the average being seventy eggs per bird per year. The value of a bird for table purposes is about seventy-five cents. Far more valuable are the birds raised for fighting purposes, which sport still continues in secret. A good fighting cock will easily fetch as much as $50.00.

Dogs and Cats.—These animals abound, but do not hold the affection of the people to-day as in ancient times. A thousand years ago among the wealthy there was a rage for keeping dogs and cats. They received human names and titles and, when they died, elaborate funerals. Kittens born were treated with the same care as was bestowed upon an infant emperor. Beautiful presents were sent to the cat mother, and ladies-in-waiting were appointed to the kittens. At a later date dogs were kept for the purpose of fighting and twelve days were set apart each month to witness the performance. These fads have long since vanished and to-day these animals receive even less attention than in the West.

The remarkable development of the animal industry during the last half century and the present keen interest on the part of both government and people in stock raising, augurs well for the future of the veterinary profession. There, as here, the factor of motor power taking the place of horse power must be considered, yet for years to come its influence will not be felt to any appreciable extent.

Ontario Department of Agriculture

FORTY-SEVENTH ANNUAL REPORT

OF THE

BEEKEEPERS' ASSOCIATION

OF THE

PROVINCE OF ONTARIO

1926

PRINTED BY ORDER OF
HON. J. S. MARTIN, Minister of Agriculture

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

CONTENTS

	PAGE
OFFICERS FOR 1927	4
TREASURER'S REPORT	4
ANNUAL CONVENTION	5
President's Address: MORLEY PETTIT	5
Report of Secretary: F. E. MILLEN	14
Unripe Honey: W. A. WEIR	16
Removing Honey: S. B. BISBEE	23
Roadside Selling: J. F. DUNN	27
My Trip to Europe: DR. E. F. PHILLIPS	33
Reasons for Winter Loss: NELSON MITCHELL, J. L. BYER, H. S. SIBBALD	47
The Swarming Problem: G. S. DEMUTH	54
Reports from Committees	63
Experimental Work by the Dominion	66
Clean up in Peterborough and Adjoining Counties: T. H. SHIELDS	70
Report of Provincial Apiarist	75
Cereals and Honey: MARY I. BARBER	78
Experiments with Chemical Solutions: G. L. JARVIS	79
The Place of the Amateur: DR. E. F. PHILLIPS	82
Modern Bee-keeping: G. S. DEMUTH	93
Study of the Hive May Increase Honey Yields: C. B. GOODERHAM	99
Reducing Costs of Production: A. F. HODGSON	109
J. A. MCKINNON	117

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9. R. E. ADAMSON, Ingersoll.
10. GEORGE NEIL, Tara.
11. E. T. BAINARD, R.R. 4, London.
12. WM. GARDNER, Gilford.
13. F. E. MILLEN, O.A.C., Guelph.

COMMITTEES

Honey Crop Committee—H. G. SIBBALD, 268 Rusholme Road, Toronto; WM. COUSE, Streetsville; W. J. CRAIG, Brantford; WM. A. WEIR, Toronto.
Revising Committee—H. G. SIBBALD, Toronto; J. L. BYER, Markham.

FAIR REPRESENTATIVES AND HONEY EXHIBITS COMMITTEE

Royal—WM. COUSE, Streetsville; H. G. SIBBALD, Toronto; MORLEY PETTIT, Georgetown.
Canadian National—WM. A. WEIR, Toronto.
Ottawa—JOHN A. MCKINNON, St. Eugene.
London—H. O. WHITE, Glanworth.

TREASURER'S REPORT

FOR YEAR ENDING NOVEMBER 25TH, 1926

Receipts		*Expenditures*	
Balance on hand, 1925	$76 28	Committee and Convention	$599 37
Memberships ($1.50)	610 00	Fees to County Societies	228 00
Memberships (.75)	291 70	Grants to County Societies	65 00
Queen Orders	1,425 22	Refunds	56 00
Formalin solution	306 05	Subscriptions to U.S.A.	92 08
Ontario Government Grant	1,000 00	Postage and Printing	204 72
U.S.A. subscriptions	74 50	Queen payments	1,334 40
Affiliation fees	115 00	Office help	178 00
Interest and Sundries	26 07	Formalin solution	309 01
		The Beekeeper	530 18
		Sundries	169 96
		Balance on hand, Nov. 23rd, 1926	158 10
	$3,924 82		$3,924 82

MORLEY PETTIT,
President.

F. ERIC MILLEN,
Secretary-Treasurer.

ANNUAL CONVENTION

The Forty-seventh Annual Convention was held in the Prince George Hotel, Toronto, on Tuesday, Wednesday and Thursday, December 7th, 8th and 9th, 1926.

PRESIDENT'S ADDRESS

MORLEY PETTIT, GEORGETOWN

I am delighted to see so many present at the opening of this our annual convention. I believe this is the correct introduction to a president's remarks, and have written it out beforehand, knowing that it would fit the occasion even if there were only a few in the hall, after the trying season we have just passed through.

For three years now we have had abnormal seasons. The crop in 1925 was not so bad, but in 1924 and in 1926 it has been most disappointing, except where sweet clover has come to the rescue late in the summer, and even that fell short this year. For three years there has been no spring worth mentioning. Instead of the flow from fruit bloom and dandelion in May, and the early June start of clover, there has been almost nothing in May, and the order has been to feed the bees in June and hope they will start business in July.

This year our candle was burned at both ends, with cold, dry winds on the start and cold, wet weather at the end. In fact we were reminded of the native in the chilly north of Scotland who was asked by an American tourist, "When do you have summer here, anyway?" "Last year," he replied, "I think it was on a Wednesday."

Some scientist has blamed the spots on the face of the sun for the recent abnormal seasons. If this is the case we may well hope that the present advertising of an old household commodity will persuade him to take a yeast cake every day and clear up his complexion. If that will not do it, I would recommend some of the honey-dew we got last summer. However, the same scientist states that the troublesome sun spots come around once in eleven years. If the eleven-year cycle applies to the honey crop as well, we may hope that next year will be another 1916, and we have been talking about the crop of that year ever since. Most beekeepers who were in the game eleven years ago will recall that the late summer and fall of 1915 was very similar to the most trying season we have just been passing through. It rained and rained all through oat harvest and right on until it froze up, just as it did this year. The next spring it started again and kept it up until near the end of June. Clover was all in bloom and full of honey for two weeks before the bees were able to work on it. Then it turned fine and hot with occasional night showers, and I never saw supers fill so fast before nor since as they did for one month. It was a bumper crop and sold for good prices and everybody was happy. Now we are afraid to hope for a good crop of honey for fear of not being able to sell it.

One does not need to be a prophet to look backward over the first quarter of the present century and to predict wonderful developments in the production of honey in the next. While most of the older sections are already overcrowded

with bees, there is still vast undeveloped territory in the newer districts. I do not know what figures would apply to other countries; but honey production in Canada is probably five times what it was five or six years ago. If it should continue to increase at the present rate we would be at the parting of the ways before another five years should roll around. In fact, we are confronted with the alternative right now. Either more adequate merchandising will put our product in its rightful place among foodstuffs, or the industry will soon die back to the farm orchard and the back lot. I cannot quite believe that the latter is going to happen, although at present the tide is running strongly toward the newer producing areas where larger crops can be obtained from the same number of colonies. I have faith in our product, and in the persons engaged in the industry, and I venture to predict that the marketing problem will be faced squarely in the other provinces as we are facing it here.

The modern development of transportation and power has done much for beekeeping. Perhaps the first step toward expansion was the knowledge that natural swarming could be controlled, and that an apiary could be gone over in a day and made safe to leave alone for a week. This came about the turn of the century. It was about ten years later that small gas engines began to be harnessed to the extractor, and it is not much more than twelve years now since moderate priced automobiles released the beekeeper from the old horse and set him on the highway towards expansion. For only a short ten years have motor trucks that a beekeeper could afford allowed him to grasp the idea of a central plant. The building of improved highways is still more recent, and the movement has just begun.

It may be that every mechanical device which it is possible to bring to the aid of honey production has been thought of by an ingenious beekeeper at some time in the past. The trouble with original inventors has been that they brought out something which did not fit the system of management prevalent at the time. The bee-escape left the honey cold for the hand extractor and required an extra trip with the horse to an outyard, so it had to wait for the power extractor and the automobile. Steam heat was applied to uncapping knives years before the central plant with its steam boiler made it practical. I suppose the straight, flat knife was the first kind used for uncapping, but without steam it was not so satisfactory. I never found where anyone used a blade long enough to reach across a Langstroth comb until I first used one myself about ten years ago.

The principle of the extractor itself has grown enormously in efficiency in recent years. Twenty years ago a six-frame extractor turned by hand was a very rapid machine. When we got to running two eights by power with one operator we thought the acme of speed had been reached. Now we can place eight *supers*, not eight combs but *ninety-six* combs in the extractor, throw it in gear and without reversing it goes ahead and empties them most thoroughly and deposits the honey in the tank where it is to remain stored until it is time to tin it up for market.

Improved transportation has speeded up production of honey in another way besides making it possible for the beekeeper to get around to his different apiaries quickly. It has made it easy for him to get out and scout for new territory when his own becomes less productive, or when he simply has an attack of wanderlust and can't help going off to look for pastures new. The father of the Dixie Highway in the U.S.A., said that he wanted to put Detroit, Michigan, ... a new idea just a few

street, and as Vancouver, B.C., and Winnipeg, Man., and Montreal and Quebec and Halifax are now, or will be all on the same street some time next summer when the Canadian National Highway is completed from the Atlantic Coast to the Pacific Ocean. Talk about Aladdin's Lamp and the Magic Carpet. Those "old guys" had nothing much on us when we seat ourselves in a nice-running car and point the front wheels down a well-paved highway which leads on and on into the great open spaces.

Until five or six years ago it was thought that the great Northwest of Canada and the U.S.A., this side the mountains, was destined to grow grain, and big stories about how you didn't feel the cold when it was fifty below zero. The people out there were supposed to be our natural market for honey because they could not keep bees, and there would be nothing for them to gather if they could. But somebody started sweet clover, and then some back-lotter had a colony which produced about five hundred pounds of honey in a season. Of course he told about it, and Frank Pellett of the *American Bee Journal* went up there to investigate. He and Mr. Floyd, who had been "seeing things" in Manitoba and had a vision of making farm homes more homelike, by the addition of a profitable apiary, these two began making a noise. We could hear them quite distinctly across the Great Lakes down in Old Ontario. Beekeepers all over the country heard them, and little Fords loaded down with tents and camp stoves and kitchen cabinets came nosing their way up from Texas and California and from several other states and provinces to see what the noise was about. They saw, too, and one of the most productive honey-producing communities ever known has sprung up there almost overnight. We are told, too, that it is only in its infancy. However that may be it is quite certain that in the short space of five or six years Western Canada has changed from an importing to an exporting area. If it is only in its infancy, as it probably is, what will become of it in the next five years? Rather, what will become of us eastern beekeepers when the carloads of western honey begin to roll eastward as ours have been rolling westward for so many years? In exporting we will have a slight advantage in freight rates; but if they are able to cut production costs by producing higher average crops that may be more than offset.

We are to spend the last afternoon of the convention discussing production costs. It might have been better if we had planned to spend each forenoon of the three days on production costs and each afternoon on selling costs and methods. Under existing conditions these two items constitute the whole law and the prophets for us, and the "prophets" are not spelled with a very big "P" either.

Across the line in the U.S.A., large quantities of best quality 1926 honey have passed from producers' warehouses at prices which prevailed twenty-five years ago when the dollar was worth twice what it is now. Even though we have been able by improved methods to boost production per man, we have scarcely overcome this difference with labour and living costs and every item of beekeepers' supplies keeping pace with the falling dollar value. Then how shall we look forward with courage to a rapidly expanding production with costs keeping up and returns falling off? The most cheering sight to a beekeeper in this connection is the thousands of bright, attractive candy stores which have sprung up in all the cities, towns and villages throughout the land. This is evidence of the fact that people are determined to consume sweets in enormous quantities. Now we know that honey is more wholesome than candy, and that [illegible] What remains

Wherever special crops are meeting with marketing difficulties, men are working on the problem of price maintenance. The principles of co-operative merchandising are pretty well established. It is now a question of securing honest and capable management and of teaching producers of cotton or fruits, dairy products or honey, whatever it is, that they must merge their individuality to a certain extent in the common good. "Each for all and all for each."

There are two reasons for taking courage from the present marketing situation, and without them I do not see how we could feel very cheerful over the prospect. The first is the fact that we have a strong selling organization already functioning in Ontario. It appears to me to be the strongest that has ever been formed by beekeepers anywhere in the world. New Zealand has government control of marketing various products. Some of the American states have strong government assistance in controlling markets, but we have something which is our own and which is getting results.

The other cause for encouragement is the fact that this is not the first time we have been in a tight place, and so far we have always found our way out. While thinking over what I was to say to you on this occasion, I turned back the annual reports until I came to the address of the late lamented Mr. C. C. James, that prince of agricultural leaders, whose useful life was so suddenly cut short a few years ago. He was speaking to us in the old hall at Trenton in December, 1904. He gave us a sketch of the agricultural development of that district, going back four generations, one hundred and twenty years, to the time when the United Empire Loyalists first settled there in the woods. I remember it all quite distinctly, but what impressed me most was the way in which he described how their adversities were turned into blessings. They were all growing barley at one time for the U.S. market, when a protective tariff suddenly cut them off and they faced ruin until they turned to livestock and became prosperous again. While Mr. James was speaking we were feeling rather discouraged over falling prices and the failure of the effort to form a selling organization the previous year. So we were quite skeptical when he pointed out the great Canadian West as a prospective outlet for our surplus. How truly prophectic his words proved to be is common knowledge now, although they did not give us much courage then. Again, in 1913, we were confronted with overproduction, and with Mr. Weir's help I was able to move out three carloads of surplus honey, a very large amount for those days. A failure in fourteen, a light crop in fifteen, then war prices gave us a marketing impetus which carried us on until the slump came in twenty-one and two. The co-operative company has staved off the evil day but it is getting too big for a mere provincial organization to handle. The sweet-clover areas are giving such enormous yields, and increase can be made so rapidly with package bees, that the situation right now seems more serious than ever before.

The four generations of agriculture which Mr. James described as lying between 1784 and 1904, were: First, the production of timber and ashes; then grain-growing; then livestock; and, finally, diversified farming and fruit-growing. He classed honey production with fruit, but if he were here to-day he would see that the next generation—1904 to 1934—was to be one of great development in our special industry. Progress has been tremendous in our own province and will be still greater in the West. That great new country which was just opening the grain-growing era when Mr. James talked to us at Trenton in 1904, is now jumping a generation and rushing into honey production as a by-product of diversified farming and sweet clover. It makes me smile now to think of how recently we gravely discussed whether sweet clover would ever be

of commercial value as a honey plant. It certainly is that, especially in the more northern latitudes, and we are told that they are just nicely beginning to grow it out West.

We have said that honey production has increased enormously in the last few years. Neither population nor per capita consumption has increased in anything like the same proportion; not in Canada at least. Such a condition is sure to produce a glut in the market. Producers and manufacturers of other foods are facing the same condition. They are meeting it by tremendous expenditure for national advertising. Take the lowly yeast cake which we mentioned a moment ago. Women quit making bread at home and there was no market for this commodity. The manufacturers did not sit down and cry. They figured out a popular use for their product and started to spend money advertising it for that special use. Now they have been able to advance the price and I have no idea how much they are selling as compared with the old days of breadmaking.

It is absolutely necessary that we follow the example of others who have paved the way for us, and *advertise*. This can only be done co-operatively. Then so long as Canadians cannot be persuaded to consume all the honey produced in the country an export market must be sought. This also can only be done co-operatively. So whichever way we turn we are confronted with co-operation as our only hope. Some object to co-operation on the grounds that many farmers' co-operative efforts have resulted in failure. I believe if the cases were analyzed it would be found that failure resulted when marketing conditions provided another way out—not so good a way, but a way! Our present or approaching condition reminds me of the boy's story about hunting a rabbit. It was an exciting chase which ended by the rabbit climbing a tall tree and escaping. The listener objected that this was absurd because a rabbit cannot climb a tree. "No, but this one *did* climb a tree; the dog was after it and it *had to*." It would be a pity to delay our efforts at proper merchandising until we were reduced to such a dire necessity.

Reducing Costs in Honey Production

When prices are high and crops good there is a danger of learning extravagant ways and not counting costs as carefully as we should. Successful beekeepers with modest tastes accumulate some surplus at such times without giving much thought to the matter. Falling prices and some poor seasons put an entirely different face on the matter and cost accounting becomes an actual necessity, where before it would have been a decided advantage. They tell a story about two Scotchmen who were in business together, and whenever they took in a penny one of them held it while the other one skinned it. That is about the attitude the beekeepers will have to take until a readjustment will bring us a better profit on our labour and investment.

By improved machinery and methods it is possible for much more honey per man to be produced; but in order to make the season's operations profitable a cost accounting system must show that the income has been greater than the outgo. It is like filling a bowl. All that comes in from sales goes into the bowl. It retains what has to be paid out for bees and queens, for repairs and painting, for selling packages, for freight and express, for insurance and interest, for labour, for tires and repairs on trucks, for gas and oil, for depreciation on trucks and machinery, for printing, postage and advertising, for taxes and rent of apiary sites, for sugar for winter feed, and for a few other things. If it happens to be a

pretty good season the bowl fills up and some runs over the top. The beekeeper calls that profit. If it is an extra good year he can enlarge the bowl by adding interest on his investment, and even a fair salary for his own services, and he may get away with it. Under existing marketing conditions he might as well omit these and save himself the humiliation of having to show a loss on his year's operations.

After installing a cost accounting system, be it ever so simple, the beekeeper is more apt to discover that some ancestor of his must have been Scotch, if the canny disposition has been rightly attributed to that race.

There are just four points I want to mention which bear on reducing costs of production. First, a location should be selected for its honey-producing resources rather than as a desirable place to live. This does not apply to established beekeepers who have a permanent investment where they are. It is rather meant to help them. There is too great a tendency for the young beekeeper to hunt up the nice town where he would like to live and squeeze in between the apiaries of men who are already occupying the territory. It is very shortsighted on their part and very unfair to those who have tied up their money in buildings and equipment with the hope of making their living. Then if the sweet-clover areas are to fulfil the promises they are making now, and continue yielding much larger average crops than we get in the older districts, their very volume of production is going to cut production costs.

A MEMBER: How much power do you require to run a 96-comb extractor?

THE PRESIDENT: The non-reversing extractors take less power than is required by the reversing machines. For instance, I ran my two reversing extractors with a steam engine, and when we were extracting rapidly it took all the draft on the fire that we could get; the fire had to be forced to keep up the steam, so as to keep the two extractors going. Now, with one extractor, turning out almost as much honey in the day, we require much less power. Speeding up the extractor and then stopping it with the brake, and then speeding it up again, requires a lot of power.

A MEMBER: What is the present price of the machine?

THE PRESIDENT: I do not think that is a question to be answered in a meeting in this way. There are different people handling the various machines, Mr. Sharp, of Guelph, with the American machine, and Mr. Hodgson is here and can tell you about his own machine.

J. A. MCKINNON: We have just listened to a splendid address, and I am not going to spoil its good effect by trying to rehearse it; however, I want to endorse all that our president has told us.

I realize that if we are to make a living from our bees, and to get enough profit to make it worth while for us to stay in this business, we have to adopt some method which will enable us to do our work at less expense; and we have also to take better care of our bees, so that we will reduce our winter losses.

Up to last spring I thought I knew almost everything that was worth knowing about wintering bees. After the smoke of battle had cleared away, and I counted up my winter losses, they amounted to over twenty per cent.; and some others had greater losses than that. I tried to discover the reason for this high winter loss, especially in outdoor wintered bees, and I discovered that bees which were wintered with porous packing over the frames and sufficient room under the combs for the dead bees wintered better than those with the sealed cover.

We had a very heavy snowfall, and I made the serious mistake of digging the snow away from the entrances early in the season. It was quite warm down in the deep holes, and the bees would fly up and get into the breeze and be drifted away. The result was that they wintered very badly.

To provide against that for another season, I went over the whole yard and raised the boxes a little, so that they would have more room above the bottom boards; and I do not intend to shovel any snow away, but to leave the snow to do its work. There was one colony in a corner of the yard that I did not find until after the snow was gone, and on examination later on I found it to be the best one in the yard, and I had not touched it at all.

Hector Inch: I think, after such a good address as that to which we have listened from our president, what I may have to say will not be very interesting; but we can have a discussion afterwards.

It is always very interesting to look back over the years of our poor crops, and it seems to be very much easier to remember our good crops than our poor ones. After a season like the one through which we have just passed in 1926, it is very nice to think of seasons when we had the supers piled so high that we had to prop them up with rails. In 1914, I think there was a very poor season, and at the convention that fall a question was brought up about what was a good side line to go with beekeeping. The problem then was under-production, and the slogan was, "Keep more bees"; and the idea of a side line was cast aside. Again, with more advanced machinery and better methods of handling, we are confronted with the problem of under-consumption.

This puts me in mind of the way I figure out the profits that we are going to make every year. I always start in the spring, as soon as the bees are unpacked, to figure up how many colonies I have alive, and how much honey they should make; and I will have the profits up in big, rosy figures. Then something will turn up about the middle of July and I have to figure all over again, and I will find that the production is only about half as much as I had been figuring on. Then in December I have to figure it all over again, for I cannot find out where the money has gone.

I think it would be a splendid thing if we could have a side line which would be profitable in the winter and early in the spring; something which would not conflict with beekeeping. I think there are several side lines which might be taken up; but you must remember not to have too many irons in the fire, and to plan the work so as to reduce the operating expenses to a minimum.

After our severe losses of this last year and a poor summer, resulting in the bees going into winter in poor condition, prospects are not highly encouraging, with scientists telling us that we are to have another summer in 1927 even colder than we have had in 1926. I think the best advice is to keep the same number of bees, not to plunge ahead expecting a bumper crop and bigger prices; but keep your colonies at the same number, because the man who sticks to the same number year after year is the man who wins out. Then when we hear at our convention of different ways of management, let us not become confused, but weigh for yourself and pick out the points which you think will be of the greatest advantage to your conditions and equipment.

A Member: Supposing, Mr. Chairman, you ask Mr. Inch to tell us what the side lines are. That would be interesting.

Mr. Inch: One beekeeper has sheep. He says he has a man who looks after the farm and helps him with the extracting; and at odd times he helps the man. The sheep business is entrusted entirely to his helper, while he looks after the bees, of which he has enough to take care of. I think the same thing would

apply to a man with a thousand or three thousand colonies. It would be more profitable to be able to hire a good man, or perhaps two, the year round.

Another thing which is coming ahead is the poultry business. The profit might be narrow, but it seems to be coming into the foreground, and if managed properly it would be a specialty like bees. I am starting with poultry myself, and am figuring that I can have my chickens coming off about the first part of April, and can have them past the danger point when the time comes to work with the bees. I do not know how it will work out, but that will be something for discussion. It is claimed that early birds are laying now, about seventy per cent. starting about the middle of November. The idea is that about the first of April you should sell off the old birds, so that you have nothing but the baby chicks to take care of in the summer time.

Another specialty is asparagus growing. Others are fox farming, or musk-rat growing, and so on.

THE CHAIRMAN: Will Mr. Abbott tell us something about poultry as a side line for bees?

MR. ABBOTT: Talking about bees, and work which will go along with bee-keeping, I do not know that I am master of them all, or am just playing at them; but if you take away the bees from me, I'll make a living out of gardening. If you take away my garden, I will make enough out of the hens. If you take away the hens I will make enough out of the bees. I think any one of the three is good enough to make a living for anybody; but you have to study them carefully whichever line you take.

As far as bees and honey are concerned, I have one man who helps me pretty well with the bees. I do the managing part myself. I work with chickens all the year around; and it is a job which, if you are to undertake it, you must know thoroughly. You think the bee business is a big business; but if you take up the chicken business from A to Z, you have an even bigger business. A man can start with bees and have a pretty good idea of the business in a year or so; but in the chicken business he could not be as far advanced in a year as he would be with bees. To take it up from the little baby chick to the hen, to the egg, and to know the ins and outs of the whole thing, in order to make a success, you have quite a proposition; even more than the government knows about it at the present time, because we have to educate the government a whole lot both in connection with poultry and honey. We have to educate the producer. We are up against considerable odds in egg production. We are tied almost hand and foot to the wholesaler, under the present system of handling eggs, because the wholesaler has the backing of the government to-day and can do as he likes, and the producer has to put up with the conditions. I know that the grading system is helping the situation considerably in getting away from the dirty and rotten egg which has been a great detriment to the poultry business.

I do not suppose what I have been saying is what you want to get from me to-day, but you wish to know whether a man can handle poultry and bees at the same time. I say he can. It is pretty hard to make a beekeeper out of a man who has not any interest in beekeeping.

As to the ordinary way of handling poultry, if a man takes it on as a side line and wishes to carry it on successfully, he has to give it his attention every day; and every day will bring its own cares. I do not know that the ordinary farmer knows whether he is getting half paid for his feed or not, or whether or not he cares as to that.

There is a system of which I have heard, but I have only known one man who has been practising it, but I believe it could be worked successfully, which

is to buy your pullets or young hens in the fall, and sell them again in the spring. That man said that to his mind that was the most profitable part of the poultry business and do away with the raising of the chickens entirely; that the increase in the price of the birds plus the winter's production ought to give a fair profit.

If you undertake the incubation and raising of the baby chicks all the way through it is quite a proposition. I know; I have done it. A man has to be pretty well alert to accomplish it at the present time, and has to be pretty nearly a professional to carry it through successfully. It is pretty hard to get the experience and knowledge without spending a little time in specializing on that end of it.

I think I have given you a vision as to where the poultry business stands and the possibilities of it. If there are questions I might try to answer them.

MR. H. A. MARSH: Mr. President, this is a very important subject, but so far I have not been able to find something which fills the bill. I know something about sheep, but you cannot stop in May your care of a flock and take it up again in December. As to chickens, I have been thinking about them, but am afraid that it is impossible to go out and buy pullets when you are through with your bees, and expect to get eggs. I have made inquiries but have found it impossible to do it.

Is there anything for the average beekeeper, unless he has a particular hobby for some one thing, into which he can go in the winter time and expect to earn money?

MR. ABBOTT: I think if anybody was to undertake to order five hundred or a thousand or any quantity of pullets early in the season, that I can arrange that he can be supplied in the fall with them. The cost of them will depend upon their age and when you want them to lay. You can get a pretty fair pullet at $2.

THE PRESIDENT: A few years ago I used to be all against trying to mix bees with anything else. I knew all the arguments and remember some of them yet. On the other hand, it is pretty hard to make a six months' business give a man a twelve months' living; and six months is about all the time we need to spend, up here in the north, on our bees; and the rest of the time we have no income and that makes it pretty hard, so that you have to look to something else to fill in the other six months in some way. Has anybody else any suggestions?

MR. SIBBALD: Could the president tell us about going south to keep bees?

THE PRESIDENT: Beekeeping in the south is all ready to do what beekeeping is doing up here—jump into overproduction. There is very little organization, and right at the present time if they happen to get what they think is a good crop of honey, they get a nice return from it. If a man gets a shallow super from each of his hives in an ordinary year, he thinks he has got a nice crop of extracted honey. At the same time I knew one man in Georgia who got as large a crop of honey as I did, and he obtained more money for it than I had obtained for mine. On the other hand, I see by reports in the bee journals there is a lot of honey in the south sitting in the beekeepers' warehouses waiting for a decent market. If you can market your product you can go almost anywhere and keep bees profitably.

MR. SIBBALD: You are speaking along good lines, when talking of side lines for the winter time, because it is a pretty good business which on the labour of six months will keep a man for twelve months.

I have experimented in poultry quite a bit and at one time was very fond of poultry; but I found it hard to take care of poultry in the summertime, when I had outyards which took me away from home. Something would happen to

the poultry while I was away, and I became discouraged and thought it would be better to go into beekeeping solely; and I have done that ever since. My best time in beekeeping, of course, was years ago. We have had discouraging times, like you have spoken of, when one wondered whether he would not have to get out and hunt a job for the winter time; and then things would improve again and he would be glad that he had not a side line because he was better able to take care of his bees when the big crop came.

REPORT OF THE SECRETARY-TREASURER, 1926

F. E. Millen, O.A.C., Guelph

During the past year there has been a slight increase in membership of the association. There are 779 members in good standing, against 766 in 1925.

A number of county associations have ceased to be in affiliation with the provincial association through not having paid affiliation fees. The following county associations are in good standing:

Affiliated Societies and the Number of Members in Each

Bruce	13	Norfolk	26
Carleton	17	South Ontario	27
Grey	32	Oxford	18
Haldimand	21	Perth	13
Halton and Peel	36	Peterboro	22
Hastings	28	Powassan	10
Huron	36	Renfrew	10
Kent	14	Russell	13
Lambton	27	Simcoe	40
Leeds and Grenville	19	Victoria	13
Lennox and Addington	24	Waterloo	14
Lincoln and Welland	28	Wellington	26
Middlesex	26	Wentworth	19
		Toronto	63

Total	635
Not affiliated	144
Total membership	779

The following have ceased affiliation: Brant, Dufferin, Durham, Elgin, Essex, Prince Edward and Stormont.

During the year, 1,953 Italian queens were supplied direct to members, a decrease of eighty-nine from last year.

Eighteen apiary demonstrations were held. This number was somewhat less than usual. The unseasonable weather accounted for a lesser number, as well as the need for using as much of the grant as possible for apiary inspection.

DEMONSTRATIONS HELD IN 1926

Date	County	Place of Demonstration	Demonstrator
June 2.	Ontario	Wm. R. Agar, on R. Mowbray's Farm, 1 mile N. of Kinsdale	Messrs. Weir and Millen.
June 2.	Haldimand	Eisman Apiary, on the Fred Rue Farm, 2 miles S. of Fisherville and 1 mile W.	E. J. Dyce.
June 2.	Norfolk	Farm of John Kemp, near Windham Centre	R. Pugh.
June 10.	Bruce	J. H. Seiffert, North Bruce	F. Eric Millen and W. A. Weir.
June 11.	Bruce	J. D. Little, Teeswater	F. Eric Millen and W. A. Weir.
June 16.	Elgin	J. A. Lunn, Fingal	F. Eric Millen.
June 17.	Perth	W. W. Rogers, Motherwell	Geo. Neil and F. Eric Millen.
June 19.	Simcoe	John Hoover, Stroud	A. G. Halstead and F. Eric Millen.
June 21.	Huron	C. H. Cartwright, Londesboro, 1 mile S. and 2 miles E.	F. Eric Millen.
June 22.	Grey	A. King, Town Line, Holland Twp., 2 miles S. Walters Falls	F. Eric Millen.
June 23.	Middlesex	Indian Institute, Muncey	H. O. White.
June 25.	Durham	Wm. Beatty, Elizabethville	G. L. Jarvis.
June 29.	Simcoe	J. E. Christian, on farm of J. Geo. Crawford, R.R. No. 2, Alliston	E. J. Dyce.
June 30.	York	R. J. Rogers, Agricultural Representative, Newmarket	F. Eric Millen.
June 29.	Carleton	Apiary of Experimental Farm, Ridgetown	F. Eric Millen.
July 3.	Grenville	A. R. Conklin, R.R. No. 2, Prescott	F. Eric Millen.
July 22.	Prince Edward	B. N. Cronk, Bloomfield	F. Eric Millen.
July 23.	Nipissing	Geo. Rutherford, North Bay, 200 Worthington St.	E. J. Dyce.

The loss in bees during the past winter and spring was exceptionally heavy, probably fifty per cent. of all the colonies in the province being killed or so weakened that they were useless for honey-gathering during the summer. Increase and package bees have increased the number of colonies this fall to probably ninety per cent. compared with a year ago.

The honey crop of 1926 was generally poor, and so far as beekeepers are concerned the year was not profitable.

The financial statement appended shows a normal condition.

MR. SIBBALD: There is one thing which the president forgot in his review, which has just come to my mind. You will remember that our membership then, in those early years, was about fifty or sixty, and our ordinary conventions would have an attendance of probably thirty-five. The present membership has just been mentioned in the secretary's report, and you have seen the attendance which from year to year almost fills this large room. These things show that there is a remarkable advance in membership and in the interest taken in the association.

THE PRESIDENT: I notice that the first item on the programme is the appointment of committees. I appoint as the members of the Committee on Resolutions, John A. McKinnon, M. B. Holmes and George Neil.

Before starting the first subject on our programme for this afternoon, we will have the recommendations from the Board of Directors. The Board of Directors met and passed on a few recommendations to be brought before this convention, and I will now ask the secretary to read the recommendations.

THE SECRETARY: Recommendations from the Board of Directors to the convention:—

1. Moved that the *Beekeeper* be dropped as the official organ of the association.

2. Moved that the members be given a queen bee as a premium for 1927 membership.

(The motion to adopt these recommendations, having been put to the meeting, was carried.)

UNRIPE HONEY—GRADING REQUIREMENTS

WM. A. WEIR

I am very glad to be with you this afternoon and deal with one of the real problems of beekeepers at the present time. Of course you all recognize the fact that my viewpoint has been largely that of one who has been coming in contact with honey as a commercial article, honey from every section of Ontario; and you will appreciate the fact that any remarks I make have to do with the handling of honey from the viewpoint of giving it to the consumer in a uniform manner.

Right from the start we all recognized that there was a great variation in the grading of honey, and that we were going to have a big problem in getting honey down to a basis where we could say to the consumer, "You can purchase honey of just the class you want for your table."

After all, gentlemen, I think you will agree with me that the maxim, "Nothing is sold until it is consumed," is the maxim which must be adopted by beekeepers. I am sorry to say that up to the present that has not been the maxim of beekeepers.

A great many shipments have been received from beekeepers which have required to be handled and turned over and re-conditioned and re-tinned before being in proper shape for the market; and even then the article has not been what it should be. One of the great difficulties seems to be that beekeepers send in honey which will not keep in storage and which lacks flavour right from the very start. This honey is classified as unripe honey, and it is to this class of honey that I want to pay particular attention in my remarks this afternoon, although, as a supplement to what I have to say, I would like to introduce to you a young man who has been doing a great deal of technical work at our office and who has been in contact with the problem from the technical standpoint and will be able to explain to you the way in which we do our grading, and how our grading has been systematized as to the shipments which have been received.

Let me tell you two or three features in connection with the unripe honey probem. In the first place, we have taken all the information that was available concerning the grading of honey, and we have been testing every sample received from the members of our company for specific gravity. In connection with that test we had one object in mind, that of trying to determine whether the honey had good keeping qualities. The hydrometer test, as you know, gives you the weight of the honey, and from the weight of the honey you can approximately figure the amount of water contained in it. Where the water content ran higher than twenty per cent., from the experience we were able to get, we considered that the honey was not safe for storage, and therefore regarded it as honey which should be moved quickly to the market or sent to the bottling plant of the company and re-heated. But we found out, as we progressed, that that test

was not a certain test; that honey was frequently received that, although it tested low in specific gravity, that is, that it was high in water, perhaps as high as twenty-two per cent. in some cases, yet would keep. I cannot tell you definitely just what there is in this problem; but from the standpoint of the company we had two different angles from which to view the whole question in order to decide whether honey was fit for market or had to be re-conditioned.

First of all we had to look at the honey from the standpoint of the ultimate consumer. Was the consumer an inhabitant of Europe or was he an inhabitant of Canada? Was the honey to move to the local markets immediately around Toronto, in the vicinity, in Ontario, or was it to move to Western Canada, or to Great Britain, to Germany or to Holland? And, looking at the problem from that standpoint, we were forced to certain conclusions. First of all, if we looked at it from an export standpoint, we had to judge the honey in a granulated condition. If we had to look at it from a domestic standpoint, we had to judge the honey from both the granulated and the liquid standpoint.

In exporting honey we found that buyers in the old country and in Germany were insisting on a very fine, soft texture, a honey that lacked that coarse granulation; coarse granulated honey would not suit them at all; and we found it necessary, as time went on, to open every tin of honey which came to St. John or Halifax for export, and examine every tin before we could determine whether it was fit for the English or the German market, or whether it should go abroad at all.

The unripe honey, so far as we could find out—and I want to say quite definitely that this problem is by no means solved and that it is a question which has to be handled very carefully and which should be handled by the beekeeper—the honey which showed a film of water, as you find honey doing when you open a 60-pound tin which has been stored for a few months, overlying the surface of the honey, is generally of a very coarse granulation and will not suit the export markets at all; and we are forced to send that honey back to the bottling plant for re-heating. For the most part—because there are exceptions—honey of that nature comes from places where sweet clover is the chief source of supply of white honey.

You ask how is that to be overcome by a beekeeper in a sweet-clover district, and I must say that I do not know. It is a problem which is still to be solved; and yet we have had at least half a dozen beekeepers who have reported to us from those very same districts that honey which was kept over in the hive, at the time the beekeeper came to take it off, showed the cells split and small bubbles in the combs, indicating that there was fermentation taking place in the cells themselves. What caused that, I do not know; and I do not think anyone knows, but it is one of the problems which the beekeeper should recognize, and when he comes to putting up honey, if he notices that there is that type of honey coming off the hive, there is but one thing to do with it. Where there is any doubt concerning the keeping quality of the honey it should be run into 60-pound tins and a sample of it submitted to the principal buying centres, so that we can handle it to the very best advantage.

Another feature that we find is that in a great many of the localities from which honey is being sent to market only one super is being used by many beekeepers. In certain seasons it is impossible for honey to be ripened before it is extracted, where there is only one super given to a colony. Honey should be left on the colony until it is at least two-thirds capped over. On this, I notice I am intruding somewhat on Mr. Bisbee's subject, so I shall not go further on that.

There are two or three factors which have been suggested to us as possible difficulties for the beekeeper. In the first place, we are suspicious that there are a great many beekeepers who are not cleaning up their extracting material satisfactorily before starting extracting. I am going to leave it to the next speaker to amplify that statement, on which I know he is in agreement with me.

In the next place, the presence of an excessive amount of pollen in honey is undoubtedly due to extracting from brood combs or from combs in which brood has been reared; and this excess of pollen in the honey may have something to do with the fermentation.

These are two of the suggestions which have come to us in the course of our work. I cannot say that they are definite, but we throw them out, because no matter what is done we have to counteract this unripe honey vigorously; because in the first place, it lacks flavour; and when you are thinking about the production of honey and particularly of preparing honey for any export market you must consider the question, "Will the consumer eat it readily and freely and come back for more?" Unless you look at this problem in that way you will not succeed in cultivating a continuous market.

I have here a set of samples which show the variety of grade, and the effects which take place with granulation. I would like you to look them over, because some beekeepers do not seem to realize what liquid honey looks like when it has granulated, nor that there must be uniformity in his pack or there will be disappointment caused to the consumer. And once you disappoint a consumer, he will not be a buyer of your honey.

At this point, I would like to give the rest of my time to Mr. LeMaistre. Mr. LeMaistre is a graduate of the Ontario Agricultural College, who has been very intensely interested in this particular problem. We have had him with us for some time, due to the kindness of the Ontario Government; and he has been giving specific technical attention to this grading question. I have simply been directing it in a general way.

MR. ABBOTT: *Before Mr. Weir leaves the platform, will he kindly tell us whether the conditions which have come before him, from inferior honey, have not been caused by the neglect of the honey before it has been taken from the hive? In a fall like this, honey left out of the hive for some time before it is extracted will be affected considerably by exposure to the air. If the honey had not been left for a time in an extremely dry place, the moisture in the air would affect it. I agree that unripeness would have a good deal to do with it; but exposure to the open air might have a great effect upon it.*

A MEMBER: Can the grade of honey, as to whether it shall be fine or coarse grained, be changed by the beekeeper?

MR. WEIR: Not by the beekeeper. We have taken honey which has granulated coarsely and which had a water film on top, and by a process which we have worked out at our bottling plant, have been able to store it and turn it into a very fine-grained honey which is accepted by the market; but that is an expense which we do not want to have if we can avoid it.

We were sending over to the English market a considerable quantity of honey which was very hard and firm, which was good testimony to its ripeness; but the English market was very much upset because the honey was so hard and firm. The English consumer has been used to a very soft, velvety, fine-grained honey. They sell the honey in the soft granulated form. We have a plan now by which we take that hard honey and soften it before putting it on the English market. That is a problem all by itself, and is not one with which the beekeeper

can deal. All that we ask is that the beekeeper will give the market the right kind of honey to sell.

In reply to Mr. Abbott's remark, I might say we have frequently visited honey houses full of piles of combs fully capped, which had been standing five or six days in wet weather. When you examine the surfaces of those combs, you observe that they are covered with moisture; which is a very unfavourable condition for a good honey.

G. L. LeMaistre: Mr. Weir seems to have covered the subject very fully, but perhaps there are a few things that I might tell you in regard to specific information on the poor packing of honey that has been apparent. I do not suppose that beekeepers who are members of the Co-operative are any different from the others.

I have found that in an analysis that 33 per cent. of honey, put up under a certain grade, actually did not come under that grade at all. Now if the market and the confidence of the buyer is to be maintained for our honey, beekeepers have to be careful to put up a product which will be in demand, and which the purchaser can be quite sure is going to be worth what he pays for it. Beekeepers are bound to go out of business, the preserves and jams will put him out of business, if he cannot put up a product which is going to be readily accepted.

There is a sample at the back of the room which indicates irregular packing. A man on buying that honey would open those pails and find them to grade anywhere from light amber honey to dark honey. If he bought that as light amber honey, he would be quite dissatisfied with what he had got. If he bought it as dark honey, he would be just as dissatisfied in finding that some of that honey was light amber.

Another point which should be brought up is the matter of scum on the surface of honey. Although actually scum might not be deteriorating to the honey, yet the man who does not know that the honey is really all right, who does not appreciate the fact that there is scum on it, would say it looks to him to be dirty. He would not go to the trouble of discovering that it was a perfectly normal condition and that it did not harm the honey which he had bought. It would simply spoil the market. It is like streaks in butter; although the butter may be quite good, the man who buys it does not like it.

Then as to fermentation. This is a very difficult problem. I have noticed honey from the same shipment, and apparently from the same man, some of it fermented and some of it not fermented. You can appreciate that if anything can be done to control this or to detect whether the honey is in danger of fermentation, it will be of vital importance. Picture a man buying a case of eggs and finding two bad eggs. He does not buy eggs from the same dealer again. So, if a man buys a case of honey and finds some of it fermented, the market for that man is spoiled.

Mr. Weir: Give them the plan you use in testing specific gravity.

Mr. LeMaistre: The honey is sent in as samples which are supposed to be representative of the honey that has been packed. A small bottle, the size of one of these, is drawn off from the eight-ounce sample sent in. That honey is heated to a certain temperature and a Beaume Hydrometer is inserted into the honey. This hydrometer is one specially adapted for determining the specific gravity of heavy liquids, and a fair degree of accuracy can be obtained. A reading on this hydrometer of 42.5 has been found by experience to indicate that the honey will not ferment. The difficulty is this, that if the sample sent in is not representative of the entire pack of that beekeeper this check is useless with regard to that part of the honey which is off-grade.

As to the hydrometer reading, I might mention that a reading of less than 42.5, say 41.9 or 42.2, is considered to represent honey that is in danger of fermentation. This has simply been the observation through experience. It is hoped that some other test may be found to indicate other conditions that are liable to start fermentation in honey, because it is thought that the moisture contained or the specific gravity reading is not sufficient to indicate the danger of future fermentation. Honey will often go as high as 44 and over that even. This honey should be perfectly safe from fermentation.

Beside the specific gravity, this honey is all carefully graded according to colour. If the sample is representative, the colour grade given is satisfactory, but if it is not fairly representative, the colour grade given by the standard does not cover the entire pack of that beekeeper. In other words, he may have two grades of honey, but he may have sent only one sample to the office, in which case mixed in with the light honey there may be light amber honey which, if placed on the market as light honey, produces a most undesirable effect.

It has been found in many cases that the separation of the sugars in honeys has taken place in storage. This is an unsatisfactory condition. The purchaser opening such a pail observes its condition as not being entirely constant; that is it is a condition which is not apparently normal to honey. Some of you will have observed the separation of the sugars in honey. The sugars in honey are levulose and dextrose, to a large extent; and it is thought that after candying a separation of these sugars will sometimes take place and one or other of these sugars liquefies, and you get a percentage of the honey in the candied state and a proportion of it in the liquid state and the result is that the test is not right. The heating has some influence on this. Probably this is due in some part to the fact that dextrose sugar on candying takes up a certain amount of moisture; and on heating this moisture will be driven off. Then on recandying there is insufficient moisture in that honey to allow the dextrose sugar to candy; and the result may be that the levulose sugar will candy, leaving the dextrose without sufficient water to candy. We have not yet done sufficient work on this to know the real reason.

A MEMBER: Which is the heavier?

MR LEMAISTRE: Theoretically they should be the same. Granulated honey may take on atmospheric moisture, but to what extent t takes on moisture before it granulates I cannot say. There should be in granulation of honey very little moisture exchanged with the atmosphere. Place honey in a sealed container and it will granulate. Obviously it cannot take on moisture from the atmosphere, and it should not give off any.

A pail of honey is not air-tight, and honey may take on hydroscopic moisture, with the result that the candied honey may have a larger amount of moisture than the liquid honey.

MR. EDMUNSON: Is it safe to fill a barrel completely full of honey?

MR. LEMAISTRE: No, it is not safe to fill a barrel completely full. Changes may take place in storage which will disrupt the barrel. Fill within one inch of the bung or plug, would be a safe rule.

MR. ABBOTT: Is it safe to have any moisture in your barrel when you go to fill it?

MR. LEMAISTRE: No, you might as well put moisture in your honey when you extract it.

MR. LEMAISTRE: I would like to call your attention to the samples at the back of the room. They indicate a number of conditions which are unsatisfactory in packed honey. You will see there everything from fermented honey to scum; and beekeepers have been known to put such honey on the market.

A MEMBER: What is the scum composed of?

MR. LEMAISTRE: It is air bubbles, but obviously there must be a thin film of candied sugars to hold the scum where it is.

You get sucrose sugar in honey at some stages; and the warming would increase the changing of that sugar to levulose and dextrose sugars, and there would be a certain amount of gas bubbles formed at that stage, and those bubbles would rise on being heated.

A MEMBER: How would you detect honey dew?

MR. LEMAISTRE: There is a specific chemical test for honey dew, which I cannot go into in detail now. Ordinarily you can detect its taste or colour, or not so much by its colour as by its general appearance. It gives something of the look of crude oil in the honey, and the taste is peculiar, rather bitter. If you get a pure sample and taste that you can always detect it in any other honey you may have.

A MEMBER: Is there any practical way of forcing the moisture out of honey so that it will not candy?

MR. LEMAISTRE: It is done in the bottling plant at Dunnville, by the Co-operative; but for the ordinary beekeeper it is not practicable. If you get honey in a kettle and apply heat to the kettle, honey being something which does not mix around, some of the honey will be heated more than the rest, with the result that probably you would have overheating of part of it before the rest of it became warm; and overheating spoils the colour and also the flavour of honey.

MR. ABBOTT: With regard to the texture of honey, would not the texture be changed considerably if the container in which it is at the time of candying had been stirred or changed to different locations, such as turning the box upside down during granulation? Would not that have a great action on the honey?

MR. LEMAISTRE: It makes a big change in the size of the crystals. You can cause granulation, in certain solutions, to form almost any sized crystal you want. There are many factors which may change this. Even acidity in the honey would have an influence upon the coarseness of the granulation. The fact that it is turned into fine particles makes the moisture in the honey, as hydroscopic mo sture more apparent; consequently the honey appears to be more of a pasty nature.

A MEMBER: The New Zealand honey is a very soft and pasty stuff. We had samples of it in this country during the war.

MR. LEMAISTRE: That may be due to the way it is handled at the time of extracting. That has an influence on crystallization. It is a very complicated problem in physical chemistry, the size of the crystals formed in the course of crystallization. There are a great many factors which may influence it; not only the matter of churning it, or stirring it while the crystals are forming, but also acidity, temperature, and so on.

MR. ABBOTT: *Have you any answer to the question as to what is our hardest* honey?

MR. LEMAISTRE: No. I wou'd say that our hardest honey is from sweet clover; but then again that hardness depends almost entirely on the conditions under which it is produced.

A MEMBER: My experience has been that you might get hard honey from almost any source. You find almost as hard buckwheat honey as you do in

white honeys; but you find that the real hard honey is always an exceptionally fine grade of honey.

MR. ABBOTT: The maple honey, in the spring, becomes so hard that bees could not use it as a food in winter.

MR. DUNN: I think you will find that all honey that 's thoroughly ripened will become very hard, if it is a heavy bodied honey. In the West the sweet clover does not seem to take the moisture.

MR. WEIR: I think that is a question of the particular locality from which the honey is harvested. We have had about a dozen varieties of sweet clover honey, and have not been able to see a common action at all. I have some sweet clover honey received from the Peterboro district which granulates very smooth, fine and hard. The same class of honey from Bruce threw off a water film; and we examined the methods of that beekeeper and found they were almost identical with those of the Peterboro man. I believe there is a great deal of difference depending upon the flowers in the particular district, and other conditions.

MR. GOODERHAM: I have seen alfalfa honey in Alberta granulate so hard that you could not break the comb. Last year, down in Nova Scotia, they got a heavy flow in September from the white goldenrod, and hundreds of colonies died last winter, leaving as high as 30 lbs. of honey granulated hard in the comb. We have found that buckwheat honey will sometimes do that in a very dry cellar; if it does not granulate it goes to the consistency of glue, so that the bees are unable to handle it.

A MEMBER: Is there any difference noticeable between the ripening or the granulation of the first gathered honey and that of the fall honeys?

MR. LEMAISTRE: Fall honeys as a rule are slightly lower than the others in specific gravity, due to the fact that they cannot be as well ripened as the others. Fall weather starts in and the bees stop work, and the honey is extracted before it is properly ripened. Especially this year, there is a considerable amount of honey which is just on the verge of being classed as manufacturers' honey; that is on the verge of 42.5 Baume's reading.

J. L. BYER: I have listened to Mr. Weir and Mr. LeMaistre, and it seems to me this is one of the most important questions raised in connection wi h honey production. It is not often that I have seen such a good sample of unripe honey as I saw recently, when walking through a well known store not many miles from here, where I saw a large pile of dark honey marked for sale at 70 cents a pail. I got a pail down and opened it, and it was a pail of n'cely granulated honey; as to colour, I would have said it graded as light honey. I was not satisfied with looking at that one pail, and I got another pail down, and started to open it. Our friend Mr. LeMaistre said that five-pound pails are not airtight; but that one was the exception, apparently. I got my knife at work and got my finger nails under it, when all of a sudden with a swish out came about a pound of fermented honey, and I was covered from head to foot. I made a hasty get-away to the nearest washroom; and when I came back I found two clerks cleaning up the mess. I do not know how many pails there were in that pile, but I did not try any more. But I wondered what would be the effect upon a buyer of such a pail. The sale of one pail of that damaged honey would very greatly injure future sales of honey.

In many years experience, producing many thousands of pounds of honey, we have been very fortunate in not having had extracted honey reported as fermenting. In our own place we store as much as 30,000 lbs. of honey at a time. We do get some honey from sweet clover. If we are at all doubtful we

would put it up in 60 lb. tins and sell it for what it is. It is a very serious matter to put poor or fermented honey on the market. If a customer had such an experience as I had recently in that store, of which I spoke, I do not think he would trouble with buying any more honey.

HONEY — REMOVING, EXTRACTING, STRAINING AND PACKING.

S. B. Bisbee

The subject I have been asked to talk to you on to-day is the removing of honey, its extracting, straining and packing. When I consented to talk to you to-day there were two things I did not know. I did not know I was going to be so busy as I have been or that I would have as bad a cold as I am now suffering from; and again I felt, and do feel yet, that I should hardly be talking to you about the removing of honey or the extracting, straining and packing of honey, because there are so many of the larger beekeepers here who know so much more about it and have had so much more experience than I have had. However, there are a few thoughts I would like to give you.

In removing the honey from the colony, only thoroughly ripened honey should be taken off. Mr. Weir mentioned in his address that honey should be at least two thirds sealed. There are certain times in the year when I do not think two thirds sealed would be enough. If it were in a rapid honey flow, with honey coming in very quickly, if the combs were only two thirds sealed I think the third which was unsealed would be very apt to contain unripe honey. So, when I say only thoroughly ripened honey, I would say that honey taken off during the honey flow should be practically fully sealed.

If the weather was warm, and there had been no honey coming in for four or five days I do not think you would have any trouble with your honey if it were only half sealed, because the bees would have had time to evaporate that nectar. and it would be pretty well ripened.

With regard to taking off honey, you are all familiar with the different methods which are used. There was a time when the beekeeper probably used only one super, and he took out the combs and had the boy along with a couple of brushes, and brushed the bees off. I think all that practice is pretty well done away with and that you are all familiar with bee-escapes, and use that method.

In removing honey, when there is a good honey flow on, we have found it very convenient, when using shallow supers, to stand the frames on end near the front; and if you have not used much smoke the bees soon leave the frames. With plenty of honey coming in, you need have no fear of robbing. In fact, I have left a couple of hundred supers in the yard in the woods, while I have taken a load of supers to the home yard. But you must not do that unless there is a liberal honey flow on.

The President: You never ought to tell that.

A Member: Would it not be better to raise those supers up and put another on?

Mr. Bisbee: They sometimes get too high for us and we get tired lifting them up. They have been so high that we have climbed on top of the winter case to get the super up. That was not this year.

In putting on bee-escapes, care must be taken to allow no openings above the escape-board through which bees may get in. We have found it a good plan, when we are putting in the escapes, not to remove the cover board from the top super. The bees will have that pretty well fastened down, and if we leave the cover board on and put the top super back in that way, the seal is unbroken. Sometimes the sun will warp up a corner which will leave a space for bees to go in. Such things as that make a good deal of trouble.

I am not intending to say much about extracting either. You are all pretty familiar with the different extractors and the different methods of extracting. We have been using an ordinary Ham and Knot extractor; and while it is not everything we would like, we are able to do the work with it. Some beekeepers in extracting have extracted the unripe honey from the combs before uncapp'ng. I have never tried that sort of thing and I would not advocate doing it. It seems to me it must be a very mussy operation. I think it would be much better to 'eave the honey on the bees until thoroughly ripened. I think it would be more satisfactory all round.

For uncapping we use two steam heated knives, heated from a small boiler which is heated with natural gas. The capping is dropped into a Petersen melter, and flows down the melter into a separating tank. If you are using a Petersen melter, it must be pretty high at the upper end, so that the capp:ngs will flow rapidly down, and when dropping over into the separator will appear to be only about half melted. With the heat which is in the honey in the separator, you will find it quite sufficient to separate the honey from the cappings. If too much heat has not been used, this honey may go in with the ordinary honey from the extractor. I know that some of you will tell me that that will have a waxy taste and that the colour will be a little off, and that it will spoil the flavour of the other honey; but I want to tell you that the honey which was used this year for the Toronto Exhib:tion had all the honey from the cappings melted in it.

There are different methods of straining honey or of separating the wax from the honey. Some allow it to separate just by gravity. The particles of wax rising to the top of the tanks and being skimmed off; if the tanks are of fair size and sufficient time is given for the particles of wax to rise to the top, and the tanks are then well skimmed, I think you will find that a fairly satisfactory method. Others use a cloth strainer. I have tried at different times to use a cloth strainer, but have never succeeded very well; probably simply because I did not know how to use it. I know Mr. Krouse uses a cloth strainer; and I was going to ask that he explain to you how he manages it; but as he is not here at present, I will tell you as nearly as I can. He has a small tank in which he has a cloth strainer, I believe, supported about six inches from the bottom; and when they pour or run the honey into this tank for straining, they run it in so that the honey will be about six inches above the cotton cloth; and they always keep it at that height. In taking off the honey, they are filling tins at the same time that they are extracting. If you allow the honey to get down so that the wax gets on to the cloth, you are done; but if you keep it so that there is plenty of honey above the cloth, the honey will percolate through the cloth.

In Dunnville we are using a wire cloth strainer which works satisfactorily. We have it so arranged that the honey comes in through this and down to the floor; and when the strainer becomes covered with wax or dirt, we can shut off the honey by closing a gate, and then we open an exhaust and another steam line, and blow live steam through it, blowing the dirt out of the exhaust.

There are some producers, I believe, who probably use the ordinary window screen. There is no doubt that while that does not take out everything it must

help a lot. Looking at this pail of honey, and noticing the bee, one concludes that there was either a hole in the screen or the bee was just flying around in the room, to get into this can; because the bee got in there before the lid was put on.

I was talking to a man in Detroit who sold his honey on the market. He said he had only one quality, and he always got a good deal higher price than his opponent did. People would come past where he was and ask, "What is the price of your honey?" It was in jars, and he would tell them what the price was. They would say, "oh, we can get it further down at so much less." His reply was, 'Mine is pure honey." The enquiry would come back, "Is not the other pure honey?" "Well," he said, "I do not know; but, judging from the amount of bees' legs and wings in it, it ought to be."

In liquefying a barrel of honey at our plant at Dunnville, we have to take out the top of the barrel; then we have a steam coil that we just drop in on top of the honey. There is a hose with live steam which comes into the centre and runs around the coil, with another hose for the exhaust; they turn out the steam and the coil starts to settle down through the honey to the bottom of the barrel; in about three hours a fifty gallon barrel of hard granulated honey will be liquid.

MR. WEIR: Would you advise the average packer to put cappings honey in tins?

MR. BISBEE: I do not believe the average producer should use his cappings in with his good honey.

In running honey from the tanks, you may skim it pretty well; but if allowed to sit there possibly a little too long while you are waiting for tins, the honey at the bottom of that tank commences to get a little cloudy and thick; and, while the honey at the top of the tank wil be a little lighter in body, with possibly a few particles of pollen or wax on the top, you think, well, we will just take some out of this, and we will leave a foot on the top that we will not put into tins. But if you watch it closely, when you open the gate the honey does not flow across that tank, but, being a little heavy, it will break straight down to the gate, and the top surface of this tank will flow right across and down; and you will get some of your wax and dirt in every tin you put up. That is one of the ways in which you can get dirt in your pails. It will be better to warm the tank. Many of you, no doubt, are not so situated that you can conveniently warm a tank of honey. Personally, I am very fortunate, because we have natural gas on the farm; and we have 1,200 lb. tanks sitting up, so that a small gas plate can sit under any one of them. The more careful you are in skimming, the better will be your honey. When running off our honey, we leave at least six inches in the tank, and then fill the tank again. Then, at the end, in the clean-up, we put all of that into one tank. As I say, we can apply a little heat, and we usually do. That which is left in the tanks is probably a little thin bodied, and carries little particles of pollen, and minute particles of wax. In the manner I have described, you get all your thin honey in one tank at the last. A little heat will no doubt help it. You will know where your thin honey is, if you have any.

J. F. DUNN: You sell your thin honey for manufacturing purposes. Would that be for bakeries, and such as that?

MR. BISBEE: Yes.

MR. COUSE: If you strain that honey, do you get rid of those impurities?

MR. BISBEE: Yes.

MR. COUSE: We have a box with a wire screen, and what strains out of that we throw into another cloth. The wire cloth will take the most out; and the cheesecloth will take all the rest.

MR. BISBEE: Yes.

A MEMBER: Do you recommend hanging a bag in the tank?

MR. BISBEE: It is possible that a bag hanging in the tank would serve about as well as Mr. Krouse's method, as long as it is kept immersed in the honey.

I have two samples of honey, both taken from a car of water white, sent to us for bottling. Anyone who thinks that ladies cannot keep bees is making a mis'ake. This one sample was put up by a lady down near Kingston, and is beautiful honey. The other came from right near here. Both were said to be water white. Possibly the one beekeeper was using coloured glasses; but he got credit for just what he sent up.

A MEMBER: Are glucose barrels good tanks for honey?

MR. BISBEE: I do not know much about what kind of barrel you should put honey in. We have received honey in oak barrels, and in ordinary gumwood barrels. The gumwood I do not think would do for overseas shipments, because the barrels are not suitably built. The requirement for overseas barrels is eight hoops. But for local shipments, I do not see but that one is about as good as another.

A MEMBER: What kind of a barrel would you advise putting honey in for next year? After you take the honey out this year how would you prepare the barrel for next year's crop?

MR. BISBEE: I do not think the barrel would need much preparation. The barrel is perfectly clean. We steam it out and it is perfectly clean. It is very questionable whether you can get that barrel properly coopered up again.

MR. SIBALD: They paraffin the inside of a barrel, when they use a new barrel. They paraffin a new barrel before they put in glucose. They often steam heat it in order to get the glucose out, because it is pretty thick; and that often melts the paraffin off the inside of the barrel, and if you want to use the barrel again it ought to be washed thoroughly and dried; and while hot is should be turned over and over, to give it a coat of paraffin inside. Honey will penetrate or a barrel will dry out after honey is put in, the same as if the barrel was empty. Honey is different from water, which would soak up a barrel and make it tight. You must put honey in a barrel which is perfectly tight; and then a week after it is loaded the barrel will start to leak, because the moisture will leave the barrel and go into the honey. It will start to leak unless there has been some preparation put on the inside of the barrel.

MR. BYER: In past years, we have used large numbers of glucose barrels. This year we could not get them from any of the usual sources. All the large manufacturers are using drums instead of barrels. We have never had any trouble, and we have shipped as high as sixty barrels at one time to the European market. Do not be in a hurry to put the honey into the barrels, but leave it as late as you can; wait until it starts to granulate. The sixty barrels which we sent at one time were granulated solid before they left us; and after the honey is granulated there will be no trouble. I think those barrels had only six hoops. It is always risky to put honey in barrels, especially in warm weather, unless granulation is showing.

MR. BISBEE: Our experience with barrels which have been filled has been with honey which has fermented. Honey is not sent in barrels to Dunnville unless the honey is fermented. It would be well to leave some air space in the barrel. We have had barrels come into Dunnville where the honey had fermented and blown the end right out. All the new barrels which we filled were oak barrels.

MR. COUSE: Soft wood barrels do not dry out as quickly as those made of hardwood.

THE PRESIDENT: There was a time when we put most of our honey in barrels. That was before we got power extractors, and when we were doing extraction in out-yards; the nicest thing was to strain the honey right into the barrel; and when the barrel was full and bunged up, nobody would steal a barrel. I have left honey in the out-yards until some time in the winter, when we have gone there and loaded it on a sleigh and taken it to be shipped. We always tried to get the empty glucose barrels a year before we wanted to use them, and store them in a dry place, as dry as possible; then just before filling, we would take a hammer of about three or four times the weight of a carpenter's hammer, and a tool made by a blacksmith, sharpened in a way that would easily catch the edge of the iron hoops; and we would drive those hoops down as hard and tight as we could with the heavy hammer.

Before driving the hoops, we would look for places where there might be openings between the staves. We would go to some swamp and get the leaves of rushes, and have those dried; those are what coopers used to use for fixing up old barrels and packing openings where staves have shrunk irregularly or did not fit. Get the leaves of the rushes dried out, slip them into the space; and then, when you drive the hoop down, it fills the spaces and the leaks will be stopped.

Cooper up all barrels well; then we have a strainer which we put over the bung, a fairly large can with a tube in the centre, making a funnel of it, having a wire cloth with cotton inside; and the honey from the extractor was poured into this.

In those days, four barrels in a day was a big day's work. And quite often we knew when the barrel was full because we saw the honey running down the outside of the barrel; then we would have to take a spoon and dip up the honey. It was well ripened honey.

The first barrels I ever filled, I had had no experience whatever with barrels, and these were sent to me from a biscuit factory, and we filled them. They lay where the sun shone on them through a window of the old house. We came back in a couple of weeks to ship that honey, and found the honey was trickling in little streams through the crack between the staves, and made them slippery in driving the hoops. As long as I live, I shall never forget the sight which met my eyes when we went into that old house and saw the honey trickling down between the staves; and we had the shipping orders to send that honey to Montreal. We drove the hoops as hard as we could. By some means the agent accepted the barrels from us; and we got by with only a few dollars for leakage, when they got into Montreal. We would not try a thing like that again.

ROADSIDE SELLING

J. F. DUNN.

I have been assigned the topic "Roadside Selling." Professor Millen has asked me to cover this subject and also to describe our method of putting up our honey to meet the demands of a retail trade.

Several years ago we decided that in order to make a financial success of beekeeping we must either get a bigger price for our produce or invest more money and run more apiaries. We decided on the former, and time has proved the wisdom of our decision. We formerly depended on a store trade, selling to merchants in one city and four smaller towns; and were always able to not only make a good

living but nearly every year could tuck something away in our safety deposit box besides. And when honey started to sell in the stores at retail at the same or less than we had been charging at wholesale, we were very glad indeed to make the change ahead of the game.

We now sell all of our light honey at retail, and, unless we have an unusually large fall flow, our dark honey as well. We have an established price for the different sized containers, and whether the crop be large or small sell at the same price year after year. Ninety per cent. of it is sold at the stand in front of the apiary. To do this, it is necessary to be located on a main highway; and an attractive apiary, of not less than one hundred colonies, with neatly kept surroundings, is a big asset in getting a trade established.

The lot on which we have this apiary is about 70 x 170 feet. The hives are placed in clusters of four, with nine feet alleyways each way. Each hive is on an individual stand. We paint the hives snow white, with now and then one of another colour to break the monotony.

We have a cool honey house to work in, with double screens and a vestibule to keep bees out. It is surrounded on the south front and west side with a rustic pergola, covered in summer with vines. On the east side, we have a latticed in garage with a light roof. The house is clear white. The office building faces the highway and is about three feet from the line of the road. The front is covered with dark green composition shingles, and the trimmings are white. The wide roof bargeboard extends seven feet over the eaves, and is latticed in on front and sides and painted moss green. The east part contains a workbench and place for tools. The other side is for empty supers.

The lot is surrounded with a lattice fence eight feet high, for wind protection, and it is also neatly painted.

The retail stand is just at one side of the office, and the whole is shaded with two large maples.

We mention these details because we consider the appearance of this apiary adds twenty-five per cent. to the amount of our sales.

Two young girls, whose home is close to the apiary, assist in the sales at the stand, taking full charge when I am not present. They also run the extractor and make the honey candies which we sell at the stand. We have a lot of receipts, but find it a good proposition to sell but one sort, a delicious French confection called Honey Nougat. It is getting to be quite an important part of the business, as sales are steadily increasing. It is a difficult candy to make, but the girls are expert candymakers and never make a miss.

Before putting up our honey, we heat it (every bit of it) to 160 degrees. Our heating equipment has had a lot to do with the demand for our honey. A large gas range, having two long burners and four round ones, is placed on a raised platform; on this we set our heating tank, which covers the top and extends about twelve inches over each end. It is really a double boiler, with a two-inch space between the walls and bottom, for water and steam. A pasteurizing thermometer stands in the honey. At about ninety degrees, the water content, or at least a large part of it, for there is about twenty per cent. of water in honey weighing twelve pounds to the gallon, comes to the top in the form of a white scum. This is taken off with a sheet of glass about 4 x 16 inches. At 100 degrees, a thin scale of wax appears on the top, and pollen grains also, thousands of which are said to be floating in honey. This is also skimmed off. We let the thermometer run to 160 degrees. At 150 degrees we shut off the heat and let it slowly rise to 160 deg. Then we open the honey gate and let the warm

liquid run on the several thicknesses of cloth over the filling tank. When nearly full, we fill the containers.

We sell a large proportion of our honey in glass, in quart and pint crown sealers, in three-quarter and half-pound jars. The half-pound jar is the best little business booster we have. Tourists and others buy them for lunches, and almost invariably load up with large containers on their way back.

We have a good comb-honey trade; and when a customer buys a few sections and says he never eats strained honey, we tell them we have never produced that sort of honey. Then when they ask: "What is that in the jars?" it gives us an opportunity of explaining extracted honey production. We ask them to step into the honey house and take a look at the super combs and the extractor. The extracting house is painted white inside, and we look out that the combs in the baskets are nice and new.

I usually get at least one extracted honey customer out of the car-load; and if they do not buy, I say, "Oh, well, you will want to try this delicious honey. Just to show you how good a sport I am, take this small jar with the compliments of the Lime Ridge Apiaries." Ten to one I have future sales out of that crowd.

In describing our plan of heating our honey, I should have mentioned the fact that when properly heated to 160 degrees honey does not regranulate. The three-quarter pound jar sitting before me on the table was put up in 1924, and you will notice that it is still beautifully clear.

We sent a sample of our honey to Mr. Weir, and the report came back, colour fine; flavour excellent; well over 13 lbs. to the wine gallon. Twelve pounds to the wine gallon is the Canadian and American standard. The honey after being properly heated is of much heavier body, is beautifully clear, is smoother and of better flavour.

Of course we have to have a much better price; but we get well paid for our trouble. You will notice that the labels on the glassware carry the same colour as our pails, "Golden Rod," in colour, and lettered in blue. It also has the triangular trade mark of the Lime Ridge apiaries. It is cast in a solid block, and gives the printer very little trouble.

You will notice that we also use our own design of pails, both five and ten pounds. Buying these in thousand lots, they cost us a little more than the red or blue pail. We put none but the finest of our honey in this pail; using for the darker and amber grades pails of another colour.

We frequently give addresses to teachers' conventions, high school students, and clubs, and exhibit fruit showing perfect and imperfect fertilization. We never fail to stress the importance of honey as a health food, offering proof to substantiate our claim.

Among our customers are a number of diabetic patients, who are using honey instead of sugar. As their physicians back up our statements, it all helps out in creating a market.

To sum it all up, the situation can be briefly stated about as follows: There is an overproduction in this country of honey; and it is just a question whether commercial beekeeping can be made to pay. The retail sale of honey, as we now have it, is a pleasant vocation, and we are making it pay. If a younger man, we might be interested in a wider field. Now, while still in full health and possessed of the joy of living, we think we are entitled to an easier and more peaceful time to the end of the road.

A MEMBER: If there is one point more important than another which has been brought out to-day, it is that whether you sell an eight-ounce bottle or a barrel the quality should be right.

The President: We like to have the people around home, who know us the best, feel that the honey they get is a little better than that which they can get any place else. I have had my own lithographed pail for a number of years. I am just about out of them, and I do not know whether I will get any more, because local sales have fallen off. The Dominion Stores have taken up the local sales to such an extent that it is becoming difficult. But for any one who is situated similarly to Mr. Dunn, or who has the natural gift which Mr. Dunn has of being a salesman and seizing the opportunities as they come along, it is a wonderful work. Every beekeeper, as far as possible, should be a salesman for honey. Even if he is not handing out the honey he should talk honey at every opportunity. You know there is a state of mind with reference to beekeeping and with reference to honey; and we have been making great strides in the last few years. I want to get by the jokes about our sweet business and getting stung, and want to find the time when wherever you go you will be regarded as a beeman on the same footing as a sheepman or as a person taking part in any other branch of agriculture. This is a business and not a joke or something which is peculiar. That will depend largely upon our own attitude to a great extent; but we want the time to come when people can buy honey without feeling that they must apologize for doing it, and when people will buy and eat honey as regularly as they will buy and eat any other line of food.

The business must be stable, and we must advertise it in addition to speaking of it in our ordinary conversation.

Mr. Dunn: Some one spoke about using whiskey barrels for honey. The first honey vinegar I ever made, I went to the hotel and got a whiskey barrel, and I put in about a gallon and a half of honey and filled it up with water, and put netting over the bung-hole. You will see elaborate recipes for honey vinegar; you can make it without all that trouble. First it turns to alcohol; then to vinegar. That made as white vinegar as you ever saw. The water was washings from the cappings. My wife had to dilute that vinegar to make pickles.

Then we used to sell our thin honey for use in automobile radiators. We use it in our own cars. For a Ford car, we use about twenty pounds; for a Chevrolet, about fifteen pounds; but most of them use about twelve and a half pounds. We have used it since 1921. It does not freeze, and it does no evaporate like alcohol does, and you always know where you are. If it gets a little low, put in more water. It will work in any cooling system, no matter what it is. Many of my friends use it without any trouble at all.

The President: I used to use the honey mixture for the Dodge, 2 to 1 of honey, and it used to heat. This year I made it half-and-half and use a little alcohol, about a pint. If there is any danger of the mixture gumming up, the alcohol will cure that. You must be sure that your connections are tight, or it may get in and gum up your pistons. It is a simple matter to check up your connections. The water is the only thing which evaporates. If you use the ordinary alcohol mixtures, you have to have the mixture tested and add alcohol from time to time, and that is expensive.

More than once I have put this honey mixture in the Dodge when the danger of freezing came; and then taken the Dodge to the South, where we would be driving 200 to 250 miles a day, and use the mixture until the danger of frost was past, then open the tap and let it run out on the ground, and fill up with water; and you are through with the worries until the next fall. If you could interest automobile owners in using a honey mixture they could go around anywhere without trouble. And that would open a great outlet for this amber and dark honey which is so hard to sell.

MR. DALTON: What solution of honey and water will freeze?

THE PRESIDENT: Mr. Gooderham told me that at Ottawa it did *not freeze* at a temperature of 20 degrees below zero, using half and half.

G. S. DEMUTH: Speaking of honey in automobile radiators, the freezing which does take place at 20 below zero is sort of mushy, and does not hurt the radiator in any way. We have had great success at Medina in using the half and half mixture or the one to three mixture, using honey, water and alcohol in equal proportions. The alcohol removes one objection to the half and half mixture, that is urged sometimes by careless people, who would start the car out of a cold garage when the weather was at 20 below zero and drive off very rapidly.

Putting in one-third alcohol takes away the objection which some raise, and the mixture flows as freely as water. The honey prevents to a large extent the evaporation of the water, the same as glycerine used to prevent the evaporation of the alcohol. If you put in alcohol for part of the water, there is no danger of freezing at even 30 degrees below zero; and at the same time you increase the fluidity so that there will be no trouble in starting up quickly.

We have been using the mixture for a long time, and can come in from a long drive and put the car in the garage and know that there is no danger; whereas a man who comes in from a long drive, using the alcohol mixtures, does not know if it is going to be all right or not. Of course honey does not absolutely prevent the evaporation of the alcohol, but our experience in driving through a whole winter is that the loss of alcohol is less than a quarter, because of the presence of the honey.

MR. DUNN: And if you put in a handful of sal soda in the solution in your radiator and drive your car for a day, it will clean the radiator thoroughly. Then, if you put in clear water, you can use the same mixture year after year.

MR. DEMUTH: Yes, I have used the same mixture for three years, using one-third alcohol. A quart of alcohol ought to last all winter with a lot of heavy driving.

There is danger in starting out with a car in very cold weather, when you are using honey and water, one to one, without first warming up the motor.

A MEMBER: They could drive, if they covered up the bottom of the radiator, which is cold and where no circulation takes place, particularly when using a car which is without a pump.

MR. DEMUTH: I have been very greatly interested in the subject dealt with this afternoon, honey from the hive to the market. It seems to me that some very important things have been brought out. One thing stands out prominently; the honey must be ripe when it reaches the consumer.

At Medina, when I get feeling pretty blue and work is a burden, I take a little run back to the honey room. Sometimes my burdens are lightened, but other times they are increased while in the honey room. They are lightened when I see the honey moving along towards the consumer. In May and June, when I see sometimes three to five carloads of honey held over, and possibly liable to sour and burst the cans, entirely wiping out possible profits, I wonder if we have given this subject half the attention it needs. I was wishing that the young man, Mr LeMaistre, who was talking to us, could have gone on.

Sometimes very thick honey will give trouble by fermentation. You cannot tell by its density or ripeness whether it is going to ferment. I have often thought that the character of the honey flow must be one of the causes for bringing about fermentation. My theory has been—and I wish we could ask this young man about this—that fermentation is more liable to take place in honey which

has been gathered during a slow honey flow, when there will be more of everything which is foreign to honey and therefore more ferments. If a drop of honey is small, it may be exposed to the air so as to gather causes of fermentation as much as a larger one; and therefore we have a more highly concentrated solution of ferments.

I was hoping we would learn a whole lot about handling the honey from the hive to the container, to prevent ferments getting into it. I think we expose our honey tremendously to ferments; the air is full of them all the time. I have sometimes wished that our colleges would get together on this and tell us what are the causes of fermentation in honey.

MR. DUNN: I might say that we have never had the slightest trouble with our honey when it has been heated slowly.

MR. DEMUTH: There is some objection to heating honey high enough to kill the ferments from the extractor, if you are sending it to the bottler who may want it candied. What is the temperature which will kill ferments? The same as the temperature for pasteurizing milk?

MR. GOODERHAM: I could not say. Mr. Jones says it is 163 degrees. He advocates heating honey up to 160 degrees to prevent ferments.

MR DEMUTH: I think heating it up to 130 degrees would kill many of them.

MR. DUNN: Sometimes in the fall beekeepers have come to me and asked, "What can I do with my honey?" I say, if you heat it properly, there is little scum comes off the top. If you heat it to 130 or 140 degrees, and leave it there for a while, you can get rid of most of it.

A MEMBER: Are you ever troubled with comb honey fermenting?

MR. DEMUTH: Oh, yes. You do not see fermented honey in the storeroom until the next spring, as the weather warms up a little bit. I do not believe that with ordinary honey which goes straight to the consumer from the apiary, there is any trouble; but bottlers must carry over honey for their trade. Consumers sometimes carry over honey and object when it ferments.

MR. DALTON: If the overrun is kept in a dry place, will that not overcome the tendency to ferment?

MR. DEMUTH: If the honey is thick enough and the storeroom is dry enough so that the honey gets very heavy, there is no chance of fermentation. I believe honey sometimes starts fermentation before it is sealed. We get a little red-clover honey, and it seems to me that that is the worst thing to ferment; it may weight 12½ pounds to the gallon and yet ferment.

THE PRESIDENT: Mr. Weir and Mr. LeMaistre are working hard on the problem, and I hope we will get the best thought of all the members as to how to overcome the difficulty, and how to standardize our product so that when it leaves us and goes to the customer and lies in his warehouse for six months, it will still be good Beekist honey of which we will be proud. We want to standardize our product so that the customer will always be satisfied and want honey in that kind of a pail.

MR. HOLMES: From the discussion of this afternoon it would seem we have not yet found the solution of the problem. Conditions obtaining in a shop or warehouse where the honey is stored superinduce fermentation. Then again, we have been told of the phenomenon of sealed honey being brought in from the yard with the cappings burst, showing that fermentation had taken place in the honey which was sealed. Speakers have stressed the importance of the combs being sealed, and that unripe honey would be in danger of fermentation. It remains for our experimenters to give us the solution of this problem.

THE PRESIDENT: The individual beekeeper is not in a position to make the scientific experiments.

MR. GOODERHAM: We tested out a number of pails of honey at Ottawa at different temperatures, and found that honey which was kept in a cold, dry place did not ferment; while honey which was exposed to changes of temperature fermented much more rapidly than honey kept in a cool place. Honey kept in a basement, with the temperature around forty to forty-five degrees, did not ferment at all. Fermentation will not take place in a cold place; and our experiments show that honey kept in a cold, dry place is much less liable to ferment than that kept in a warm place.

MR. CRAIG: I have listened to what has been said on this subject of fermentation, and I think it is caused by changes of temperature. For four years now we have kept our honey in the basement on wooden shelves, never on the floor, and it has kept well.

MR. GOODERHAM: Would it not be better to stamp the grade of the honey on the pail rather than to educate people to the colour of the pail? This fall I had my attention drawn to people who had seen the advertisements of Beekist honey and did not know that there were two grades, and who bought the red pail and were disappointed. They did not know that the blue pail contained the highest grade.

A MEMBER: In that case it would be better to put Beekist honey only in the blue pail.

MY TRIP TO EUROPEAN BEEKEEPERS

DR. E. F. PHILLIPS, ITHACA, N.Y.

I want first of all to express my deep satisfaction in coming back to Ontario again. I have had this opportunity on several prior occasions when I have been able to attend your meetings, and also going to the Agricultural College at Guelph; and I have never come across the invisible line which separates us politically without great satisfaction at least to myself.

I want also to bring to you the greetings of your co-workers of New York State. They watch you with great interest, and I hope you watch them.

One thing which I found out from my experience this summer, which I knew before, was that beekeepers are about the same everywhere. It is not any great shock to come among Ontario beekeepers because I am with the same kind of people on the United States side of the line most of my time.

It was my very rare privilege last summer to go to Europe to visit beekeepers over there. While in the government service in Washington it always seemed impossible to get away. But after, as your president said, I had served my time there and was let out on parole, I found it possible to take the summertime. As you know, the general idea is that college professors never do work any time, and do not work at all in the summer; but I never worked harder than I did last summer.

But it did seem possible to get in this trip, for which we had longed so many years; and on the 2nd June, Mrs. Phillips and I left New York city.

The 2nd of June was a little before the end of the term, as the commencement exercises did not come before the 15th June; but, when the schedule of examinations came out I scrutinized it and found that my examinations closed on the 1st.

The boys had been able to tell all they knew about beekeeping, and I had my assistant ready at the door to grab their papers and rush them to me, and we had them all graded and in the hands of the secretary at five o'clock that night. That was speed; but it had to be done, as I had my packing to do and to catch the 11.50 train that night on my journey.

There was not anything of interest to beekeepers on the way over; but I found two excellent men on board who knew nothing about beekeeping, but who wanted to know about it as soon as they found that I knew about it. They said they would at once go into beekeeping upon their return.

We arrived at Cherbourg and went to Paris that night, arriving about midnight. Nobody knew we were arriving. We just slipped in, and the next morning at seven o'clock we slipped out again, which was not easy to do. Mrs. Phillips and I had been hearing about Paris and its bright lights all our lives, and we drove to the hotel in a taxicab, and it was rather hard the next morning to pull out for Switzerland; but we knew we were coming back and that it would be all right.

We went on that day to Berne, Switzerland. We had figured that our boat, the Berengaria, was a seven-day boat, but she was a six-day boat. There was nobody at Berne to welcome us and we went out sightseeing. We expected to meet some of the beekeepers that afternoon; and along about one o'clock the strain was telling on me, so we looked up good old Dr. Loyanberger, the editor of the *Bee Journal,* and in charge of the bee disease control work for Switzerland; and over and above that he is one of the dearest old gentlemen I have ever met. He is living alone with a housekeeper, his wife being dead and his children all married off. When we got down there, of course the housekeeper did not speak anything but German; and Loyanberger is about the same in German and English, and I asked for him; and she rushed upstairs and the old man came down with his arms outstretched to greet us. We have had a good deal of correspondence; he writes to me in German, and I reply in English; and we have got along very well; but it was very much more difficult in conversation. My vocabulary in German is very limited, being almost entirely confined to beekeeping. Mrs. Phillips knew a little German and the words she knew were not the same words as I knew and we got along very well indeed. The old gentleman knew a few words of English. And if we got stuck, we would use the English word, and the doctor would scratch his head and say, Oyah. Once we did not get together, and I tried him on French, and he understood French about as well as he does English; and twice we had to try Latin. We got along well, because of the delightful spirit of the old gentleman with his earnest determination that nothing was going to stand in the way of having a good time while we were in his country.

In the afternoon we drove out to see Dr. Morganthaler. He has worked on the brood diseases of bees and he had confirmed all the things which have been found out on this side of the ocean. He has also done wonderful work on adult diseases. We found Morganthaler one of the most delightful of German men I have ever met. He is the most German-looking German I ever saw. He looks just like the make-up you might see on the vaudeville stage, of a German, with a little round face; he is perfectly bubbling over with joy at seeing you, but without any Prussian characteristics.

We found he had a little more English than Loyanberger, and so got on a little better. When we went to his laboratory and were introduced to him, I asked him if he spoke English. No, not a word. But before the day was over, I found he knew a good deal more English than I did of German; and by the

time we left him, at the end of five days, he was speaking English very well. All he needed was practice.

The following day we were taken, as the guests of the German-Swiss Association, to the Jungfrau. They had the very good grace not to call a meeting o- their association; so I went up as their guest with Morganthaler. We went to Interlaken, and as we would pass peak after peak, Morganthaler or Lyonberger would name the peaks, and one or the other would tell us about the time that they climbed a certain peak. Morganthaler had not done any climbing for many years, but they know those mountains thoroughly.

The Swiss are enchanted with their mountains, and they never become monotonous to them in the slightest degree. There we changed to a smaller train with a more powerful engine, which took us up to——————, and there we saw the —————— waterfall which falls 950 feet. It is fed by glaciers at the top of the mountains, and very little of the water hits the bottom of the precipice over which that water came; it was simply broken into millions of pieces and went off as a cloud of mist. We there changed to another road, which climbed still more rapidly; at any rate we went up to—————— at the foot of the Jungfrau. And here we changed trains to the celebrated —————— road, which would have carried us clear to the top; but we did not go all the way up but only as far as —————— glacier.

I had read about glaciers, and I knew what glaciers could do for beekeeping, but all the glaciers I knew anything about, or the effects of them, were those that happened about fifty thousand years ago. I was not on speaking terms with a glacier, and so I was very glad to get off the train and onto the glacier and see what it looked like. There we had to have our pictures taken. Morganthaler took them. Finally, on the other side of the valley he saw a Swiss flag flying, and nothing would do but we must walk over there and have our photographs taken under that flag. It turned out to be a very good photograph.

When we got to the hotel looking out on the Jungfrau, we said something to the manager about the beautiful view, and he said, yes, that the peak was visible for the first time in thirty days, so that we were in luck; and that night, before we got out of sight of it, the top of the mountain was again clouded over.

The next day we went back to the Grandeville, and back to ——————, and finally back to Berne. We had started about seven o'clock in the morning, and it has been a very strenuous day; and when we got back about half-past eight in the evening, we thought we had properly made a day of it; but that did not satisfy our friends, and they took us to the casino there, and we had a regular dinner. Not a banquet, but a fine dinner which they had for us, and it was pretty late when we got through and left them.

The next day they took me out to see a German-Swiss apiary. They showed me one at ——————, which is probably one of the largest in Switzerland. They said there was a larger one, but this was the most accessible. The Swiss is very much the same as the German type of hive; it opens at the back, and you take out the frames by the use of a long pair of forceps. You bring a frame out and put it down in the box, and you go back for the farthest frame. If you want to get a frame which is at the front of the hive, you have to take out all the intervening frames. To me it looked impossible. I thought that surely a hive like that must be practically as immovable as a box hive. While it is possible to get the frames out, I did not think anybody would have the courage or fixity of purpose to get the last frame out. But I found that they handled them fairly easily and that the difficulties are not as great as they sound because they took them out very quickly. They showed us these frames in order to convince me

that that is the proper kind of hive to use. So I nodded my head and said ya, at appropriate intervals, but came away unconvinced.

After noon, we came back to Berne and got our baggage started off for French Switzerland.

The day we went to Emmenthal was the first day of the beekeepers' meeting at ————————. While I can understand French moderately well, to sit at a beekeepers' meeting all day while a good deal of the proceedings went over my head did not appeal to me. That day we took the celebrated trip through the tunnel down to the Rhône valley to the city of Brunn, which is on the border of Italian Switzerland.

I think I ought to say a word about the wonderful thing the Swiss people are doing. There is an area in which only German is spoken; another area in which French is spoken; and a third area in which only Italian is spoken. And yet these three people are all living together peacefully under one government; and all during the Great War they stood there as a sort of an island in the midst of the war and they got along harmoniously with each other. It is really a wonderful accomplishment along what we might call international lines for this country to be maintained as it is.

Morganthaler went with us over to French Switzerland. We had about an hour's wait for a train, and he wanted to use that hour as well as possible, and he said, we will just leave our baggage here with the porter, and I have something to show you and we will come back. It is wonderful the confidence every one has in the porters. You give a porter your baggage and say you will be back after a while, and he stays there with it. We did that all over Europe and we did not lose our baggage. In *Gleanings* for this month there is a picture of the gateway of that church, through which you can see a glimpse of the apiary of the old church. We went down a little alleyway at the back of the church, over a steep hill, and we went down and he brought us into a basement or cellar which was the bone-house. Over there they used to have a very pleasant custom of renting a certain space in the village cemetery, when any one died; then when your rent expired they took your bones out and put them in the bone-house. You have no idea how beautifully it can be done. However, that has now been discontinued.

In due time we went over to meet our friends, the French-Swiss Beekeepers' Association, some of whose members you saw at the Quebec convention. About a dozen of the officers of the French-Swiss society had come to the station to meet us. We had been three days in German Switzerland trying to speak German, and when I wanted to speak everything would come to me but the French I knew. I did not know any Italian but a few words; and I got everything mixed up in the first two hours I was there. To speak German in French Switzerland is not the best thing to do, but we got by with it.

We knew that there was to be a banquet that night and thought perhaps we would be taken directly to the hotel; but the beekeepers had their own ideas. They had been in session all day and had held the session in the garden upon a mountain side, and remained in session until we arrived, and we all went over there. They were all sitting in the garden at tables which were spread out with bottles of wine galore. I never saw so much wine in my life as I saw in French Switzerland. Coming from dry America, we acted very discreetly.

The French-Swiss are the most effervescent people I have ever seen. We have always thought that the French people were always bubbling over and making a noise, talking fast, and using their hands a great deal. But they are

talk and more singing in French Switzerland than we found in France. When we arrived they were called to order, and they drank our health. and sang to us. When they began to sing, it was the same tune as our national hymn in the United States, and the same tune as God Save the King, which we were later to hear in England and Scotland. We had the idea that they were singing "America," translated into French for our benefit; but, instead of that, they were singing the French national air, which has the same tune. That was news to me, because I did not know that the Swiss used the same national air as does England and the United States. After that, Morganthaler had his health drunk, and they called him "Our Morganthaler." They simply opened their arms and took him in, and he is wonderful. After this little ceremony we were taken down to the hotel in an automobile. Their automobiles run very well downhill but not so well uphill. That is one thing which impressed us very much this summer, the low power which they use in their automobiles. The license per horsepower is very high; and the result is that you will be taken across the country in a machine with 5 or 8 h.p., with the result that a little grade is taken on low.

When we got to the hotel we had a few minutes to get ready for the banquet. We went over to the cafe where the banquet was to be held, and the tables were spread out under the trees to accommodate probably 300 people. The grounds were decorated with electric lights in Japanese lanterns. Just as we stepped inside the gate it began to rain. And then the little cafe keeper was another character who ought to be described—he looked like a vaudeville artist. When the rain started to come down, he absolutely went out of his mind. The cooks, the waiters and everybody came out and took the things off the tables and into the house. He may be out there talking yet for all I know; but he certainly did not do anything towards managing the thing, judging by the way he kept tearing around.

The rain necessitated some delay, but finally we got seated inside at the banquet which was a very wonderful affair. They had the very good grace not to call on me for a speech. By that time I was getting my French a little and would have been able to say a few words; but I was very glad there was no occasion for me to try to talk. Finally, as the meeting was coming to a close, we heard music outside, very high grade classical music being played by a symphony orchestra of about sixty pieces. By that time the rain had stopped, and the beekeepers as they left the banquet would go outside. We were taken out there, and as we came onto the scene of action, the orchestra stopped playing what they were at and struck up the Star Spangled Banner. You have no idea how good that sounded to us away from home. After that was over, sixteen little girls came out, dressed in white, and they had on gauzy wings at their backs, and on their heads they had great big things which would represent the compound eyes of bees, and out in front were little antennae. These little girls sang a song in French, a three-part chorus written for the occasion, and it was wonderfully done. We found out later that the French are practically all good singers; they stress music in their schools, and these little girls were well trained. The beekeepers encored them until the little girls must have been almost exhausted. The proceedings were delightful all the way through. One of the beekeepers went to the platform and raised his hand, and the whole crowd stood; and after the little girls got through singing they went through the crowd and pinned an American flag on everybody present. You see they were doing everything they could. The littlest of these girls came down and gave Mrs. Phillips a sheaf of flowers, an enormous thing. Everywhere we went, Mrs.

Phillips was loaded down with sheaves of flowers, beautiful flowers wonderfully collected and artistically arranged. Then they came and brought me a little souvenir of my visit, which was a watercolour painting of the old castle which stood up above the old city, together with a poem welcoming me to the city. The only person in Seon who could write in English was one of the white sisters at the convent, and her English was in every respect unique. She had lived in Ireland as a young girl, and her English was pretty well gone. The poem was beautifully embossed for the occasion.

About eleven o'clock the orchestra stopped and folded up their instruments to go home. Mind you, we had been going since about six o'clock that morning and thought it was about time to go home; but they invited us up on the balcony of the hotel, and there we sat at tables. They were not intemperate in the way of drinking excessive quantities of wine, but each one of them had a bottle of wine before him. One of the beekeepers began to sing, and he was promptly joined by all of them. By this time the stars had come out, and we were sitting practically up in the treetops, because it was a rather high balcony, and the lights of the Japanese lanterns below us made it just like fairyland. After that song there was a short lull, and then some one thought of another song, and they started that and all joined in. And they went on in that way, one song after another.

Finally midnight came on, and I did not know how long the proceedings were going to last; then I thought there is just a bare possibility that they are waiting for us to go home and do not want to break up until we go home. I spoke of it to Morganthaler and he said "No, but you can go any time you like." So shortly afterwards we went to our hotel, and we have been sorry ever since that we left so soon, because we found out the next morning that they had sat there until half-past three o'clock in the morning. You know what beekeepers are like—you sit and talk bees. The French-Swiss had a better way, and they sang; they all knew the music and the words, and everything was delightful.

The next morning, at seven o'clock, the automobiles were waiting to take me out to an apiary to see a sample of disease. Fortunately there was no disease there. We stopped in the way at the convent to thank the sisters for their kindness; then we took a trip thirty-five miles back into the mountains. Unless you have seen the Alps you can have no conception of what it was like to us. I have seen the Rocky Mountains in different places, but nothing to equal that trip.

When we got back we had to have another banquet, because when two or three are gathered together they have to have a banquet. And that afternoon they had me scheduled for a speech. After the banquet was over, instead of staying in the banquet hall to have their toasts and talks, we turned out into the street, and we had the head man of that section of the canton there to make an address of welcome. Then the president of the French-Swiss society made an address, and then the presidents of the different local societies delivered addresses. Just about the time they were getting ready to ask me to make a speech, the rain came down in torrents, and all had to run into the hotel, so that luck was with us. It rained all the way back to Seol. We took a train from there to Geneva. I would like to describe that city, but it is impossible.

The next day we went to visit the home of the man who wrote the first book or thesis on honey, published in 1794; and his house is still standing and in an excellent state of preservation. They tell me it belongs to the estate of Baron Rothschild, but it has no mark as the home of Huber. The beekeepers of France had traced it down. When I drew their attention to the fact that it was not marked, they said they would have a bronze tablet erected.

I cannot tell you all the wonderful things we did that day, except that that night at Geneva we had a banquet, in preparation for our farewell. The next morning at about 4.30 we started for Nice, arriving there at midnight that night. There was a little delay where we changed trains and had our dinner, but we rode on trains for eighteen hours. We rode second class, which is the proper thing to do in France. We took the entire trip for $5.16, American money, on account of the depreciation of the franc. Never before had I been a millionaire, and never since. If you wanted anything, you got it. If you wanted a taxi, you took it. For example, in Paris, I rode from the outskirts of the city to the hotel in the centre, a distance of between four and five miles, and when I got there I gave the driver the usual ten per cent. and the bill was 24 cents. One morning I took a taxi 14 miles, and he brought us back again, and the total bill was $2.14. If you took that trip over here, you would have to buy the taxi.

There we were met by Baldensperger, who is a very charming and delightful man. I do not know whether he was here long enough for you to get to understand him as well as we think we do. He is the great cosmopolitan in beekeeping. He speaks French, German, Italian, English and Arabic and quite a number of other languages. He has travelled all over the world, and is known to beekeepers practically everywhere, and is the most loved man in all French beekeeping. They always speak of him over there as Pere Baldensperger, as a mark of esteem. He had to tell us all about the trips which he had ahead of us, so that it was pretty nearly daylight when we finally went to bed.

I cannot go into the details of our trips in France, because the Swiss trip occupied only five days while we were in France for a month; but I am going to tell you something of what the beekeepers over there did for us. The first day, for instance, we had a banquet with the agriculture officials of the Department of ——————, to which the officers of the Beekeepers' Association and various beekeepers were invited. From that time on for fifteen days we had fifteen banquets with fifteen different groups of beekeepers. There were more than fifteen societies. At Marseilles eight societies had a combined meeting for us. They had a federation composed of the various societies, and the officers of all the associations were there with many members of the associations, so that it was quite a big affair. It was a strenuous trip all the way through. We would get up about six o'clock in the morning and start off. Always there was a banquet in the middle of the day. Not an evening affair, they way we do over here and in England and Scotland, but a noonday affair. You would sit at table for three or four hours and eat the most delicious food that the human palate was ever tickled with. I have been asked by a lot of women over here, just what did they have and how was it cooked? I may admit that I have tasted some awfully good food on this side of the Atlantic, and have thought it was pretty good; but they do not speak the same language when they talk about cooking. In France everything seemed like a dream and the food was the most delicious we had ever eaten.

In addition to the banquets we were taken for two trips into the French Alps, as well as two trips into the Pyrenees, and each time they would have a banquet at some hotel away up in the mountains.

When I have told them about the fifteen days in which we ate our way through France, a great many people have said to me, "Well, weren't you almost utterly exhausted when you got through with it?" Of course they would expect our digestion to be a total wreck; but no such thing happened. We had no digestive difficulties whatever, because the French breakfast consisted of a cup of coffee and a roll; and after a banquet we did not eat anything at night. We were on the go from six o'clock in the morning until midnight day after day; and

the trip did not tire us at all. The reason, of course, was that we were seeing new things, meeting new people, and having new experiences every minute; and we did not have for a moment to think about a schedule. When we were going, they would take us to the station and put us on the train. There was no planning for us to do. All we had to do was to hand out a few hundred francs here and there to lubricate the way; but when we were getting 750 francs for every $50 American Express Order, it did not matter. We met most charming and delightful people.

In only one place in France did we encounter what on this side we would call commercial beekeeping. One day at Mulhaus we had a banquet with the beekeepers in the region of ————————, and that afternoon we went by automobile back into the Basque country to the home of a Basque baron. These people are not French and they are not Spanish; they have a language of their own and their own type of clothing. They are a distinct people. Those on the Spanish side are loyal to Spain; and those on the French side are loyal to France. But they maintain their integrity, their ancient customs and traditions. We met the baron, who was very proud of the fact that he was a Basque. He had been educated at Oxford and spoke excellent English, with an English accent. Whenever you find a person in another country with a peculiar accent in English you find it very amusing. The baron spoke English with a very English accent. He was a very charming and delightful gentleman. He showed us off in the distance the old family castle which was built in 1076. He said that when they were married he and his wife went into that old castle to live and stayed there for one winter. But, he said, in 1076 they did not build with good modern accommodations; and in the spring he built another house. The whole front of the house was open. We were there in the summertime when the great folding doors were thrown open and made the living room like a porch. We had been due to arrive there at three o'clock; but it was half-past eight when we finally arrived, the delay being due to some automobile difficulties. There was waiting for us M. G————————, who was to take us up to his home in the Department of Lyons. We had to stay to have tea, and they really did have tea, because the baron had been educated in England and had formed the tea-drinking habit. In most places in France you do not have tea although they called it by that name.

You could see that M. G———————— was very nervous. He had expected us at half-past three, and he had forty miles to go home. As soon as it was possible to do so, we said good-bye to the baron's family and got into M. G——'s automobile, which was a high-powered car. We had been driving since six o'clock that morning, and about half-past eleven or twelve o'clock that night we were driven up to his house in ———————— and we were ready to call it a day; but when we approached the house we could see it was all lighted up. Madame G———————— came and greeted us. She did not speak English and knew that we spoke very little French; so she made up for it by talking to us very loud. In a few moments the butler came in and announced that dinner was served—at midnight. As we came into the room, a great bevy of young folk got up. Mrs. Phillips said, "They are having a party." But that was not the case. Madame G———————— introduced us to her children down the line, and there were eight of them. One of them was married and her husband was there, and two of them were engaged and their fiances were there, and there were a little girl and a boy beside, so that we made quite a family.

They had expected us for seven o'clock dinner, and we had been late in arriving. Although we arrived and had dinner at twelve o'clock midnight, everything was as fresh and fine as possible, and no one could have guessed that

the meal had not been planned to be served at midnight. It takes a long time to eat a French meal, and it was about half-past one when we finished, and we were about dead for sleep. Finally we got through dinner and we hoped we were going to be allowed to go to bed. M. G———— said, "We are leaving here to-morrow at seven o'clock, and it is going to be awfully hard to do anything with the bees before seven o'clock. Would you mind coming out to the apiary? I have something there which I think is American foulbrood." The only answer, of course, was "Why, no, I would be just delighted, that is what I have been hoping to do all evening." So he and Baldensperger and the chauffeur and I went to the apiary. When the chauffeur was in the automobile he never took his eyes off the road or said anything unless his employer would address him. But going into the apiary, he took off his chauffeur's cast and talked to anybody. But just the minute he returned to the house he wouldn't say a word, and was clothed with all the dignity necessary to his position.

We went out to the apiary, and you all know how nice that would be after midnight. We made our trip with the aid of a lantern and four candles. When we finally diagnosed the trouble, he was glad to be satisfied on the point, but otherwise was not very well pleased.

When we got back to the house, we started talking about bees. The first thing I knew I was sitting on a hive, Baldensperger and M. G———— on another, and the chauffeur on a third. You will understand that what is true about beekeepers on this side of the Atlantic is also true of them over there.

The next morning we started on a trip and drove through a real commercial beekeeping country. It is remarkable beekeeping territory. Really the Department of Lamonte is practically new. It is only about seventy-five years ago that the land was drained and recovered from a great salt marsh. Mile after mile you would drive through turpentine pine trees. Of course there, as here, the woods were kept open. The whole territory is covered with trees the same size, as in England, Scotland and Holland. It makes a wonderful commercial beekeeping territory.

THE PRESIDENT: How big were those pine trees?

DR. PHILLIPS: They do not keep them very long. The largest were not more than a foot through. Here is a problem for you beekeepers. There the honey which comes in in August is so thick that it cannot be extracted. The place is full of beekeepers; and when one goes in and talks about moveable frame hives to them, they ask, "What is the use of talking moveable frame hives to us, because we have to squeeze the honey out anyway?" When I went into the apiaries and saw how they operated them, I did not have any answer, and do not know an answer yet. They can handle it for disease very well. You do not have very much trouble from disease when you kill off more than half your bees every season. In spite of all the difficulties, the big fellows are going into modern equipment. M. G————'s apiary was entirely on modern Langstroth equipment. He had sent to America to get hives as samples, and had his equipment made exactly according to the samples which he had received from America. Only reason his apiary did not look like one back here was because the hives were not painted white. He knew he ought to do that, but he had varnished the hives instead, and it was a stunning looking apiary, without a weed, absolutely clean in every way. He has been taking the journals from over here and receiving the bulletins and the books, and is thoroughly well read on the methods of beekeeping on this side of the Atlantic, and is practicing them; but he is doing it by rule of thumb and was making some mistakes because of difference in conditions. The ordinary white-clover practice did not fit in with his con-

ditions. I told him, "Your honey flow comes in August and you must imagine you are in the buckwheat harvest and let it go at that." Anyway, he was a commercial beekeeper, and we visited men with hundreds of colonies in that territory who were sending honey out by the ton. They have a real commercial development, and it is getting better and better every year, but they are having quite a bit of trouble in getting all of them into moveable frame hives, because it is hard to argue against those conditions.

Finally we came to ———— to visit the factory manufacturing bee supplies. I looked that factory over. It is very small compared with what we have on this side, but they are growing and coming along, so that their future looks very bright.

While visiting these various beekeeper associations, Baldensperger made a plea for the Langstroth memorial. There is a committee, as you probably know, raising funds for that memorial, and Baldensperger took his duties very seriously, and everywhere he went he put up his plea and got money. He got 635 francs. I did not want to put that 635 francs into the endowment fund, because it takes 750 of them to make a twenty dollar bill, and it occurred to me to buy books over there.

Finally we went up to Paris. There we went to the Paris bookstores, going to one after another asking for books on beekeeping, and after working hard at that all the morning we found nine books, which would sell for 3 to 4 francs apiece. There was one more place on my list which I was particularly anxious to visit because he sells a good many books on this side. We went there and asked M. Chevallion if he had any books on beekeeping, and he said Oui. We found out later that M. ————, who wrote a very excellent book on beekeeping, was retiring from business and was turning over his books for sale, and the bookstore man said, "All or none." I took the cards and said I did not want certain of the books at all; but he would not listen to anything short of all or none. I asked him, "How much for all of these?" He said, "You can have those for a thousand francs." That was 97 books for about $24. Some of these books were very rare, old things, treasures for anybody who is collecting bee books. I said, "You won't sell me just these?" "No, all of them." I said, "All right, I will take them all. Now, you buy secondhand books, don't you?" "Yes." Then I asked, "Do you buy secondhand books on beekeeping?" "Oh, yes." I said, "I have some to sell you." He said, "Is that so?" I said "Yes." He said "Where are they?" And I said, "These," and gave him the cards. "How much will you give me for these?" You see the profits of a secondhand bookseller are something stupendous. He said, "I cannot give you the price you paid on these. I have to have a little profit. I will give you 100 francs for them." I said, "All right, they are yours." So I got the rest of the books for 900 francs and shipped them over to America, and they are now in our library as a gift of the French beekeepers. Do you know that bookseller thought that was a dirty American trick, selling those books back to him after he had just made a sale. Nevertheless I got the books wanted, and they arrived safely.

I would like to tell you all about Paris, but there isn't sufficient time, and anyway you can get that a great deal better out of guide books.

We saw a lot of very nice beekeepers in France and had a glorious time with them, but not a meeting with any society. Finally, Mrs. Phillips and I went over to London, arriving there on the 12th of July, the hottest day they had there this last summer, so we thought they were giving us a warm reception.

I have to be very careful when talking about England and English beekeepers; not because I am in Canada, but because of the political situation

among the beekeepers, which is something terrible. You never know, when you meet a beekeeper, what faction he belongs to, and there is not an overwhelming lot of harmony among them.

The first morning that we were there, Mr. Morgan, of the Apis Club, met us. I was president of the Apis Club and will be until the 1st of January. Mr. Morgan began to tell me about beekeeping politics. I said, "I am not interested in that, but can you give me any general advice?" He said, "Don't talk to anybody about anything, and you will be all right."

In a few minutes after I had been given this very good advice, Mr. W. L.—— turned up. He is the whole thing in the old orthodox crowd, while Mr. Morgan is one of the Bolshevik crowd, as they are called, but they were still speaking to each other, so we got along fairly well, and I managed to make plans with both of them for various things.

That day we saw London, making a sort of orientation flight, and we spotted various things about the city. That night we went up to Luton where———— home is, and where his apiaries are located. The following day we started out on a trip by automobile. The Minister of Agriculture asked Mr. ———— to place himself at our disposal for July, or such time as we were on the ground, and to turn in the bills to the Ministry. We were over there during the coal strike when the railroad facilities were very much reduced and the train accommodation was down to about one-third of normal, so that if we had tried to cover the country by railroad we would have had a hard time of it; but, having the automobile at our disposal, everything was lovely.

Before the Ministry had made this offer, I had made arrangements with some of the beekeepers' associations to meet them, and we had got into some difficulty because of some of the associations having unfriendly relations with others. Therefore I had to be very circumspect. The first meeting was with the Apis Club. They had a field meeting at the apiary of Mr. B———— at Surreytown near Reading. It was a very fine afternoon, with a lot of beekeepers present, on the 14th July. On the 16th, the British Beekeepers' Association brought on a regular whirlwind affair for us. The English use field days, which were more like garden parties, and the people were delightful, and of course we could get on very much better with them because they speak the English language or think they do. Some of them around Yorkshire were almost as hard to understand as the French, as a matter of fact; but we got on very well with them. They had beekeepers from all over England and from Wales and a few from Scotland, and had a banquet. I met men there whose writings I had read for years, and the experience was a wonderful one.

The following day we went down to the Kent and Surrey associations. The greatest opponents of the British Beekeepers' Association are the people of Kent and Surrey, who withdrew long ago and have been fighting them ever since. So I had to be very careful in what I said, and did not mention a word about the day before.

We also met with the Glocester and other associations.

Probably the very best days we had were not the field days, when you do not have time to sit down and talk and find out about things, but when you could go to the homes of the beekeepers and sit down and have a good chat and go to their apiaries and see what they were doing, and what others in the country were doing. In that way and by that means I think we learned more about beekeeping in England and Scotland than we did about beekeeping in France because there were opportunities for more leisurely talks.

While the political situation was very bad indeed, yet talking about bees we could get on all right, even although the members of different associations were at loggerheads. And we had some delightful experiences. Those of you who have read the *Bee World* will know the name of Rev. B. Wright, who lives at Newton near Salsbury. We met him at the Club Conference, and he invited us to come down there and visit him. When we arrived, we found he had arranged a programme. He first took us out to Old Sarum, the scene of an old fortress built back in the Roman times. Besides the fortress there are the remains of the old Sarum Cathedral, of which nothing now stands but the foundation wall. Then he took us into Salisbury to see the modern cathedral. Then he took us down to the museum of the town, where we met Mr. Frank Stevens, an archaeologist, and after showing us rather hurriedly through the whole museum, he took us into a model of Stonehenge as it now stands, and reconstructed as they think it was at the time it was built; and he has been working over Stonehenge to find out its significance for twenty-five years, and is full of it. After listening to his description of it, we went out to Stonehenge, and it meant something more than a pile of rock. There were a lot of tourists there, but they never take time to read what the guide books tell them. One of the strange things which Mr. Stevens told us about the wonderful old temple was that if you stand on the altar stone and look towards the east, there is a stone on the horizon out there which has a point on the top, and they believe that that stone was so placed that the priest on the altar on the longest day of the year would see the sun come up over the point of that rock. Since Stonehenge was built the earth's course has been deflected, and by finding out how far off from the real point that is, they can calculate the age of Stonehenge. In the meantime, of course, the stone has been worn off on the top. It was probably pointed when originally put there. Taking that calculation, Stonehenge was probably built in 1919 B.C.

I asked Mr. Stevens if he thought the Druids put it there, and he said no, it was long before the Druids and was an entirely different people.

In the same way we saw Oxford and Cambridge. We went there with the beekeepers. Morgan, who was a graduate of Cambridge, took us and showed us all the interesting things. And then we met all the principal beekeepers. Morgan's home is in Oxford, but he went to Cambridge, so he knows one place as well as the other; therefore we had a delightful experience. Time will not permit me to tell you all about the places to which we went. Some of you may have visited them. If you have not, I would recommend you to do so.

When anyone from an American university goes to Great Britain and sees their universities which have been in existence for hundreds and hundreds of years, it makes us feel awfully young. One night during dinner with the masters and deans of college, Cambridge, after dinner was over we went up to the room which is used as a sort of a club room for the faculty, and we sat there and talked about American universities and English universities, their differences and similarities, and had a very enjoyable evening for me, and also for them, because they think that we do the strangest things. During the evening one of the dons asked me when Cornell University was established, and I told them 1865, and a very great quiet came over the assemblage because they felt that he had erred, because their college was founded in the fifteenth century.

One of the dons, a perfectly charming old chap, said, "You refer to Cornell University as one of your large American institutions?" "Oh," I said, "Cornell is not large. We are not one of the largest universities by any means." He said, "I thought it was. How many students have you?" I said, "About 5,500." He said, "If that is not large, what is large?" "Oh," I said, "Columbia Univer-

sity has 42,000, and the University of California has 49,000." "Well," he said, "that is almost as big as London." They were perfectly amazed at what they call mass education on this side of the Atlantic, and I do not blame them.

We were at Oxford when the Prince of Wales arrived at Oxford. He was president of the British Association for the Advancement of Science, and he delivered the presidential address. It turned out afterwards that he had been ragged by the royal family for his audacity, but he had taken the ragging very well indeed. Afterwards the royal family presumably were very well pleased with his address. The scientists were very well pleased. It was a discussion of what science means to the people and to the State, meaning thereby the mass of all the people. It was a very fine address and made a big hit. The Prince, of course, is exceedingly popular at home; but they did not make half as much fuss about him in England as we did when he came over to visit the United States.

Then we went up to Scotland. We had had a good time everywhere and we did not think it could be surpassed any place; but if there was any spot which stood out it was our Scotch trip. The first person who met us at Aberdeen was John Anderson. You have read his articles in the journals. He is editor of the *Scottish Beekeeper*, and is bubbling over with wit, good humour and high spirits. Mr. Anderson told me at a meeting that he was very much disappointed in me. He said, "You know, I thought when you came over here that I could have a good round fight with you, but I find that we agree on too many things." I think he was in earnest, because he has a fight with everybody, but does it in such good humour and with such a broad grin that you cannot get mad at him. He is a most delightful man.

We got into Aberdeen at about half-past ten o'clock by train from London, and we were met by Anderson and Marshall White, another Aberdonian beekeeper; and we went out to Anderson's, and there we talked and talked. He did not sing to us, as they did in the south of France, but we talked bees for hours. The Aberdeenshire Honey Show was on. We visited a number of honey shows over there, and they are delightful institutions, where the beekeepers bring in their exhibits of honey and wax in small quantities, generally six sections of comb honey or six jars of honey, and they compete very strenuously with each other for prizes. And the judges, who are old, hard-boiled fellows, who have judged for a long time and do not care for anybody, ruthlessly award the prizes and then get out. We visited a number of these shows and enjoyed them very much indeed. I did not see that it was a particularly advantageous thing from a marketing point of view, but the thing that impressed me was that they gave the beekeepers a chance to stay together for two or three days and get acquainted and talk without a programme.

If we could get our beekeepers together without a programme they would get more than they will out of a meeting conducted on more formal lines. A honey show gets them all in one place and keeps them there, and in that way is highly advantageous.

The Apis Club gave us a dinner in London, and then the Aberdeen Club gave us a banquet in Aberdeen. Aberdonians pride themselves on their thrift and claim that they are pretty close. We found out that it was all a snare and a delusion. Never was there a more wholehearted people than those we met in Aberdeen. I accused them of using these jokes about Aberdonians for the purpose of advertising their city, just as Henry Ford uses the jokes to sell his car, because they are the best advertisements that a Ford ever had. They rather admitted that perhaps it was so. Anyway we had a jolly good time with them,

and we proved conclusively that these things that are said about them are not true. Mr. Hempsall happened to be in Aberdeen when I was there, and he got up at their meeting and told them that this had happened. He collects matchbox tops. He says when he was going along he saw a matchbox and when he picked it up there were two matches in it.

We went down to Edinburgh and met Cunningham, but Avery, who is in charge of the work, was in the south of England on a vacation. Then we went over to Glasgow, and from there to Kilmarnock, to see ————, and there we ended our trip. There we were in the Burns country, and we were taken over by Tinsley and Major Ewart, and Mrs. Tinsley was along. And every place where we went that had anything to do with Bobby Burns, they repeated all the poems which Bobby Burns had written about that place. Nobody could have gone through that country under better auspices than we did.

Finally the Western Scotland College had a field day for us. Beekeepers came from all over Scotland and quite a number came up from England, so that about 250 were there.

The following day we drove into Glasgow, and the next morning we started for home. That was a pretty strenuous three months. We met with the beekeepers in twenty-five different places; met with about thirty-five different associations, because in several places two or three associations met together. We met a large number of very good beekeepers, the very best beekeepers in these countries, and had an experience I will never forget, and I learned a great deal about bees.

Bees are not the same over there as they are here. For instance, we did not see very many Italian bees. I was very much interested in seeing their black bees, and found that the black bees in Switzerland and southern parts you could handle just as you can handle the bees over here. I have been wondering ever since where the black bees on this continent came from. They did not come from England, because the black bees in England do not behave the same at all.

I met a large number of beekeepers and a considerable number of societies and came away with a very rich experience, an experience which I hope some day some of you may be able to duplicate. It showed me a different angle of beekeeping. But I came away convinced that after all there is something in beekeeping which brings the right kind of people into the business. Everywhere we went we found the finest people in the community engaged in beekeeping. There seems to be something about it which inoculates people with honey instead of with bee-sting poison.

I am glad to have had an opportunity to introduce you people to some of our friends on the other side, and to tell you that they are actively working along progressive lines. We have been told, or at any rate have had the impression, that the beekeepers of North America are the good beekeepers of the world, and that there is not anything practical about the beekeeping of Europe. I came home at the end of the summer utterly convinced that the supposition on our part is absolutely wrong. So much depends upon what you call practical. If you call it practical to run a thousand colonies of bees, there were not very many of them practical beekeepers. But if you call it practical to handle colonies in the most advantageous way and to get the maximum crop and then to sell the honey and get the highest price, I would say that the beekeepers of Europe have got it all over us. They do handle their colonies efficiently, and they handle their honey when they get through with it so that there is no market loss. If that is not practical, I will have to have my definition revised. They are producing a large quantity of honey efficiently and are selling it advantageously,

and I think that is a pretty high degree of skill. Over there they think that beekeeping in America is the most superb thing in the world, and it will be necessary for us to do our best and to pay a little more attention to our work. There is a great deal we can learn from them, and it will take us a long time to understand fully what they are doing; but, as I said before, beekeepers in Europe are certainly a fine bunch of people.

MY REASONS FOR LAST WINTER'S SERIOUS LOSS

NELSON MITCHELL

In the following few remarks I wish to outline my reasons for the serious loss in bees throughout Ontario, and at the outset does it not seem quite human to many of us to lay many of our failings and misfortunes at the feet of Dame Nature.

When we look back over the fall of 1925 and think of winter in earnest by the 18th of October, with skating rinks in full swing, cattle and other live-stock snugly housed in winter quarters, and many beekeepers forced to shovel the snow from off the summer stands in order to place winter packing cases, an operation, however, gently performed, causing the bees to more or less gorge themselves with food, and then not be able (on account of weather conditions) to have a cleansing flight all winter. Need we wonder that our losses were heavy? Further, many apiaries were fed too late and the bees in those apiaries never had a flight at all after taking down their feed.

I maintain that a cleansing flight after feeding is most essential toward successful wintering. Most apiarists feared heavy losses would occur. Yes long before we knew of the long drawn out spring we were about to encounter.

Most of us I think expected that after the long winter that we would have a nice early warm spring. In this we were again disappointed, in that we had one of the most backward and late springs in many years.

Pollen there was, but the bees could not get to it. The soft maple came and went, the willow came after awhile and the bees missed it, supplies in the hives were ever getting less and less and on top of all, scarcely a day fit to open a hive. In due time the dandelion came in full bloom, yellow as gold, and if my memory serves me correctly, our bees only had two days on them on account of cold winds and dull weather, though they secured enough nectar from dandelion to promote brood-rearing and also food for a couple of weeks.

By this time all our heavy combs which are always stored away for spring use, were all used (in our apiaries at least one for each colony) and right along all over the Province till clover came it was a case of feed, feed, and those who *did not keep watching* their colonies closely right up till clover were heavy losers.

Another cause for losses and this one we can take to ourselves, and that is the lack of adequate wind breaks. Many apiaries here and there are poorly located, having neither natural nor artificial protection. Really I place more importance in the wind break than in the packing. In two of our yards we have found it necessary and very profitable to erect a temporary board fence just for the winter, through the centre of the yards.

In our locality we notice it plainly year by year as the remaining bush gradually becomes thinner and thinner the wisdom of providing and maintaining good protection for the bees against winds.

To prove my point, I beg to quote the success and failure of two small beekeeper friends.

Last fall, one put away 15 colonies, well fed and well packed in an ideal location. They became completely buried in snow and it remained around them till late in the spring. Result: 15 good colonies of bees and a fair crop of honey.

The other put away 42 colonies well fed and all snugly packed in good winter cases, absolutely exposed bare to the north and west winds and with no snow around them when spring came. He found the results, and to quote "Uncle Josh" after his barn had burned. "He managed to save the foundation" loss 66 per cent. and balance in poor shape and little surplus honey to be sure.

Again many beekeepers are not careful enough to pick out all pollen clogged combs in the fall before feeding time, and if the hives are weighed with those combs in, they weigh heavy and the result is starvation before spring. As for ourselves, we lost 11 per cent. all told, 10 per cent. with sheer starvation and 1 per cent. with dysentery, replacing all dead stands and secured an average of 64 lbs. clover all around.

However, in summing up, have we as beekeepers not reason to be thankful, when we consider for a moment the agriculturist and how he has failed this year. Farmers in Ontario have this season lost hundreds of thousands of dollars in spoiled crops, sprouted grain, rotten grain and straw. Turnip crops mostly ravaged by aphis, corn lying out in the fields, sugar beets not harvested and so on.

Truly the beekeeper has taken a heavy loss this year, but we all got some honey and we are all sold out and in fact could not fill all our orders. Our dead stands all renewed. With from 25 to 30 per cent. honey carried over from 1925, in the Province with No. 1 honey becoming a byword and a drug on the market, brother beekeeper let us look forward to 1927 with cheerful heart.

J. L. Byer

In nine out of ten years, 90 per cent. of winter and spring losses are caused by starving or poor quality of stores. The winter of 1925-26, was no exception, and in addition to the food problem, weather conditions and other factors aggravated the situation.

In our York Co. apiaries, certain conditions of the summer and fall seasons, caused the bees to go into winter quarters with abnormally large clusters of bees. During the month of October when feeding was being done, very unusually cold weather prevailed and at some of our apiaries, the bees never had a cleansing flight during the fall, after the feeding was done. Very cold weather throughout the early winter caused heavy consumption of stores and consequent uneasiness of the colonies, resulting in early brood rearing and undue waste of the vitality of the old bees. As a consequence, honey consumption was unusually heavy, and many colonies starved out before it was possible to examine them in the early spring, owing to late season with cold weather continuing all through March and April. While our losses in York Co. were not so heavy as many reported, yet it was much more severe than usual, and as intimated, all losses were caused by shortage of stores, influenced by conditions I have outlined.

At our Binbrook apiaries we had slight winter loss although quite a few colonies dwindled down in late spring. At these apiaries, all colonies were practically solid with stores in early winter, a condition that means almost

perfect wintering no matter what weather conditions may prevail. While bees no doubt winter well in many cases, when provided with a so-called food chamber, allowing empty space below honey for bees to cluster on, I am convinced that they winter well in spite of this handicap rather than because this arrangement is a help to them.

It takes more fuel to heat a large room like the one we are meeting in than for a room half the size, and I feel positive that the more compact we can have the winter stores placed for the bees, generally speaking, the more perfect will the wintering of the bees be one year with another. At least we have found it so in practice, and this past spring when about all beekeepers were feeding their bees we found it unnecessary at our Binbrook apiaries, even if the hives used there are smaller than the usual size advised by most beekeepers. With a comparatively small brood nest solid with stores in early winter, early and unseasonable brood rearing is not possible as there is little or no room for the queen to lay eggs. That means saving of stores and saving of the vitality of the old bees, as young bees reared in January are procured at a tremendous expense of honey and the vitality of the bees that have to feed these young bees being reared out of season.

Good queens, proper protection of the colony and other factors enter into the problem of good wintering, but above all else good stores in plenty, and in the proper place in the hive, are the main provisions that will insure good wintering one year with another, no matter what conditions we are apt to encounter in the way of weather extremes and other factors beyond our control.

H. G. SIBBALD

All the known causes of winter losses combined in one winter sums up the situation in a nut shell.

Early frosts, very severe weather early in the autumn season hindered feeding, making it late before all colonies were fed and then cold continued right along giving the colonies no chance to fly after feeding, causing uneasiness or restlessness, dysentery set in causing loss and leaving others weak and useless.

Early feeding would have helped to prevent this loss.

In some apiaries honey dew was gathered after the honey flow and wherever it was left in the winter stores, was fatal.

To avoid similar loss supers should be left on and all of this honey dew extracted before feeding time

Some colonies starved with some stores left in an unoccupied part of the hive. The weather was so cold without any mild spells that clusters could not change their position as they would otherwise have done.

Some starved outright because they ran out of stores, owing to the long continued winter and very late cold spring. These losses could be remedied by more generous feeding, the extra ten pounds more than we think necessary is often a good investment.

Snow did damage in some yards, usually it does no harm to have the hives covered for a time, but in some locations the snow drifted in so heavily that colonies covered so long became uneasy and bees crawled out only to perish.

The yards that wintered best were the early fed and best sheltered.

One yard well sheltered, packed in leaves and mostly in 8-fr. L hives was in excellent condition and with only ordinary loss.

My own idea of perfect wintering condition is a small hive, or a large one divided so that the colony pretty well fills up the hive and fed up until all combs are sealed nearly solid.

THE PRESIDENT: There was a point brought out in Mr. Mitchell's paper read by Professor Millen, about pollen-clogged combs. We always used to think that pollen-clogged combs were somewhat of an evil in a hive. I do not know how we got that idea. The only harm that pollen-clogged combs can do in a hive is to give a false conception of the quantity of stores in the hive, or they may restrict the possibility of the queen laying. Pollen combs are one of the best assets that a hive can have in the spring; and I very seldom take pollen out of the hives any more.

While there is something in what Mr. Sibbald says about contracting down to a small space which the bees will just occupy, there is also another side to the question. If we have more room in the hive, and are able to overcome the disadvantage of the greater amount of room by using heavier packing, there is an advantage in that it cuts our labour costs a great deal. The labour of taking out those extra combs, putting in the division boards, and packing in a large case, would be considerable. Then you must be there early in the spring, when the bees start to breed, to give them the room they will call for. The large space makes that system more elastic, gives them more opportunities to go on without close attention otherwise required. I am not denying anything that Mr. Sibbald said, but this is a question which you have to figure out for yourself, as to which will be the more profitable in the end, to save labour and expense required in giving the very close individual attention, or to run them more on the wholesale plan.

My summary of last winter's experience in wintering is this: that colonies carefully prepared and well protected from the cold, by a natural windbreak, wintered well in spite of all conditions. I have in mind one yard that wintered almost as well as usual, and I am going to tell you what shape that yard was in, and this is another thing along the same line as to whether we should have our hives more convenient to work with, by unpacking them from quadruple cases or having them in single cases all the year around. The yard that wintered the bees was close to a cedar swamp, with a natural wind-break all around. The hives were in single cases; and there were hives in that yard on which the sun has never shone on the entrance because of being faced up against a cedar tree and away from the sun. We get just as good returns from those hives as from any others. The dense natural thicket prevents the wind getting into the entrance. It is not the sun shining on the entrance that we want to prevent, but we want the shelter from the wind.

In an extreme season, like last season, when everything happened that could happen, we want the very best possible conditions; and that was what we had in that yard. By the way, that yard all had food-chambers. They were nearly all in jumbo hives; and have wintered better than anything else I had, and almost as well as usual.

MR. MARSH: I would like to give my experience and get some advice from older beekeepers. I want to find out whether I am to blame for my losses, or can throw some of the blame on nature's shoulders. I did not have any winter losses, and in fact after the bees had made a couple of flights I thought I had learned about all that was known. The bees seemed strong. They did not breed up well in the fall before, I know, and that may be the cause of the trouble. Then from that time on, the bees went bad.

I had one yard in which, when I came to dig them out after the first warm day came, the only way I could find the hives was to walk over the rows. Those hives wintered well until after they had had a few warm days and had good flights, after which they went back. What was the cause of their going back after they apparently had wintered well?

THE PRESIDENT: They had not wintered as well as you thought they had. The individuals were weak in vitality from the long winter. They were all old bees, and were ready to die off, and died off before the young bees came on.

MR. MARSH: Could I have remedied that in any way? I had young queens in nearly all the colonies. Could I have prevented it by stimulative feeding?

A MEMBER: If there was plenty of food in the hives. I think stimulative feeding would not have done any good.

MR. DUNN: As there seems to be a little time, I want to tell you how our yard on Garrison Road came through. We had about 113 colonies in the fall, apparently in good condition. We use the food-chamber, and have used it for a good many years. Mr. Morley Pettit uses it, and he must have between 600 and 1,000 hives; I do not know how many. Mr. Demuth, the editor of *Gleanings in Bee Culture*, had a good many colonies, and he uses the food chamber. It is a necessity for them. Quite a large number of others also have made a great success with the use of the food chamber.

Last summer, we had a flow from a new source, the wild carrot. I have been told by some that they never have got any honey from that plant. We did not get much from it last year but were delighted to think it was petering out; but we had a little of it in our stores and did not know what to do with it. Mr. Weir was anxious to get a sample of it and I told him I would send one down to him.

I put a shallow super on nearly every one of the 113 hives. On some which were abnormally heavy, I did not put one. I was afraid of that honey, because I did not know whether my colonies would winter on it; therefore I fed nearly every colony a ten pound pail of honey, thinking that would help and would be about what they would consume up to the time they would go into winter. When the bees started to fly this last spring, when they ought to have been all right, out of the 113 there were 106 flying. That was not bad, and I was congratulating myself that it was very nice, and was more than ever in favour of the food chamber. Why not use that honey, instead of putting so much inferior, dark honey, on the market, when you can give a certain amount of syrup as feed, and if there is any danger at all, it will be overcome and eliminated. Then, when the clover flow came, 96 out of that 113 colonies were flying. We lost a few which became queenless. I think that is a pretty good record; and will confess that is about the best I have done; but it is nothing new. I would not say to put a whole super on top of a hive; we do not use the full depth supers, for many reasons; but we use the half-storey size.

This winter we did not get any carrot honey, but we got honey which was darker and was gathered fairly early. We went over the hives, and there was not a colony that did not have one good super of well-filled combs. In that yard it meant perhaps 100 supers. Then what happens? The top story I do not pay much attention to, and I do not pull those hives all apart to see what condition they are in. I forgot all about them and go on with my business. The queen has that top storey pretty well filled with brood, and sometimes there is some brood down below. Then, when the clover harvest comes on, we raise that super and put a queen excluder underneath it, putting the queen down below. With

the brood on top, in another ten days you have to cut out your queen cells. Cut them all out but one, from which you may raise a young vigorous queen.

If you put a thermometer at the entrance of the hive, it will show about the same temperature as out of doors. We very seldom have zero weather with us; if it does fall to zero it only lasts a day or two. If you put your thermometer a little higher inside the hive, it will show you that it is about as cold there as out of doors; but up where the bees are, it is pretty warm. We used to winter with the honey board sealed down tight; now we break that joint.

You all know we use the double walled hive; and you have seen pictures of our hive. We take an inch board and split it twice; we put a piece on each side with cork in between. I am asked what we put on top of our brood chamber. I will tell you what we do; we never use any metal pieces; we set our wooden rabbet right on top, and the box telescopes over, about half an inch over the water table, and bevels off. You do not need to go to the expense of making a great big cover; so we make an inverted hopper with the mouth about an inch smaller from the top of the hive; it is made of three-eighths-inch stuff; some of it is a little more than that. Then we take forest leaves, and some with cork packing and cushions on top.

It was pretty cold when we got them all on, and the bees were not in the supers but were down below; but the minute we put on that packing, up the bees came. It is a good idea to have about an inch hole bored in your honey board, with something over it to cover it. In the spring do not disturb it, but put on a top storey; and if there is any doubt about it, give them a little bit of sugar syrup. This last fall we gave one colony fifteen pounds; and that is all the sugar we fed this fall.

A MEMBER: Do you have foulbrood?

MR. DUNN: We do not have any American foulbrood. We always put back the same supers on the hive. It would be dangerous, if there were changes made, from another part of the yard, where American foulbrood might be.

MR. DEMUTH: The impressions I get from listening to these discussions about winter losses is that they were preventable; that they could have been prevented if the beekeepers had had things as they would have liked them last fall. If they are not preventable, then we are in a business like agriculture, where we cannot have everything just like we want it, but I gather that we can go a long way towards having things like we want them.

After being ragged about the food chamber, I feel a little better when I hear somebody endorsing it beside myself. I felt pretty lonesome for a long time when championing that idea. The criticism of the food chamber is largely a matter of misunderstanding. It is one method of supplying the colony with an abundance of stores through periods when they must have abundance of stores. It does not function in the winter time; therefore if you wish to take it off in the winter time and put it away, and put it back on in the spring, be sure and do that and do not extract the honey and sell it, and that will be all right. I have always been afraid to recommend the food chamber in Canada, as you are rather far north. But in the United States, going about the country and seeing the number of colonies which are actually starved or reduced to the verge of starvation at the time when they must have plenty of stores, namely, during the fall when the cluster of bees is being reared for winter, and during the spring when rearing must be done for the spring, I cannot refrain from pushing the food chamber method; because it was one method of inducing careless beekeepers to leave plenty of stores on their colonies, instead of getting them down to nothing. I have often heard of one beekeeper in Canada who, in the fall, when there was no fall honey

flow, found some bees actually starved to death in August and September, because the supers had been taken off down to the brood chamber, when there should have been bees reared for winter.

Someone has said to take off the supers and let the bees rustle for a living or let them starve down so that they will not be so strong and eat so much supplies. But that is the time, in August and September, when they are rearing the winter cluster, and we cannot starve them down during that six or seven weeks without endangering their existence.

Someone spoke about his bees going down in the spring. It must have been because they were reared too early.

The food chamber is not a device for increasing the size of the brood chamber, as some have urged. It is not, as some have accused me of doing, advanced by me so that the supply dealers could sell additional food chambers. On the contrary, we are telling the beekeeper to use something which he already has. I have already said to use the thing which you have already got, and quit buying things. But the food chamber is a device, as I have often said, for the beekeeper who is careless, and I am not talking about Mr. Byer because he is not the sort of a man I am directing my remarks to, but I am talking to some beekeepers in the United States, and I tell them that if every beekeeper in the United States, big and little, was determined to leave a good supply of stores with his colonies during those two important bee-rearing periods, I would be afraid about our marketing problem, because we would increase our production by four or five times. It would reduce the number of colonies which would be down in the spring because of shortage of stores on account of the beekeeper not getting around to them early enough. The food chamber does bring the careless man out of the hole.

A MEMBER: I would like to tell you about a small yard that I had to do with, up at a small village, Kenilworth. There were twenty-five colonies, well surrounded, well protected from the wind; every one had a half super of feed on top; and all of them came through in splendid condition in the spring, and made about a hundred pounds per colony this year. At the same time, bees that I had in other sections came through very badly.

THE PRESIDENT: My boys who help me in Georgetown sometimes ask me, "Why are your apiaries all in one direction? Why do you not branch out in another direction, where the country is fairly flat, with dairy farming, and you can hardly see a swamp or bush; and the only trees there are are near the dwelling houses."

I have often driven out that way, but I cannot see a place where I would want to place an apiary. It is in the poorer, rougher country, where the returns may not be so good, where we have the old cedar swamps, places with a natural windbreak, that I like to place my yards.

No doubt a lot of last year's winter losses might have been prevented; but some of the speakers have mentioned conditions which were beyond our control. I had one yard with nearly 100 colonies wiped out; there were about 30 odd weak colonies left; and they were in a place where they have generally wintered pretty well. I was not there in the winter to see what was wrong; but from what I have heard from others, they were all covered with snow, over which a crust was formed; so that they were smothered out. Mr. Krouse had some bees which were killed out in the same way. We cannot always find the conditions that we want, and there are conditions which we sometimes cannot prevent.

THE SWARMING PROBLEM

GEORGE S. DEMUTH

I cannot refrain from expressing my gratitude and my feelings at being in Canada with you at this time. As we advance a few years in our lives, we live a little more in the past and think of the structure that we have built up. I remember distinctly some of the things which came to me as a boy; more distinctly than some of the things which came to me yesterday.

In the early days of my beekeeping experience, when I was wild over the subject—I have not got over it yet—we read so much from Canadian writers, that it seems to me that you have had among you some of the greatest contributors to what has been called American Beekeeping.

It is a real pleasure to us to be among you, because we seem to be all members of one big brotherhood.

I am talking about swarming before the beekeepers of Ontario which seems like a big undertaking, and I am wondering if you know what is coming to you. You know the subject would require about four or five hours to fully develop it.

Ontario beekeepers have solved this swarming problem so completely that it seems very strange for me to stand here and talk to you for three-quarters of an hour or an hour upon this subject, when you have already solved this problem for yourselves.

A MEMBER: Not quite yet.

MR. DEMUTH: Almost as well as I can tell you.

Perhaps we will understand the problem a little better if we go back and read you the developments in the achievements that we have already made. There was a time when swarming was looked upon as a very desirable thing. I lived in a small town of about sixteen to eighteen thousand inhabitants, and across the way from where I lived was a beekeeper who had eight or ten colonies, and he would usually greet me in the morning with words like these, "Good morning, how are the bees this morning?" During the swarming season the greeting changed somewhat. I would reply, "They are doing very well." He would say, "Mine are doing fine, I have got six swarms to-day." That was his idea of what was desirable.

The late lamented Dr. Miller, it seems to me, expressed the beekeeper's feelings best of all, in regard to swarming, when he said that he got the same kind of a thrill out of an announcement that bees were swarming as he got out of an announcement that a cow was in his garden. It was something to be avoided just as far as it was possible for us to avoid it. Our immediate predecessors in beekeeping, working out beekeeping problems, had this problem to solve. They said that when a swarm issues from a colony producing comb honey, out went all prospect of completion of the sections which were in that hive; because the swarm is in a separate hive, and possibly two or three after swarms would come out of that colony, which would be done for the season. Unless by some mere chance they would come through the season without swarming, they could not get results in the finishing of comb honey.

One of the greatest problems in the solution of the swarming problem was the method worked out years ago, with which you are all familiar, and which I will use as an illustration, which was called in those days a method for the prevention of after swarming. That was a misnomer; it should have been called a method for keeping the colony's forces together for the honey flow. The prevention of after swarming was not the main thing; but I use it as an illustration. A swarm issues; you take off the supers, move the brood chamber away, put a new

brood chamber in place of the old one, return the supers to the hive; place the parent colony close to the swarm. That much of it is keeping the forces together in one hive; but here is what was emphasized, the parent colony stood at one side with the entrance turned away, in a day or so later was turned around, so that the entrance is towards the swarm; then in a few days the parent hive is picked up and put in a new location, so that the young bees which have learned to fly during the week would unite with the swarm. There were two additions to the swarm. All the bees which were in the field when the swarm issued and was being hived, would come back to the new hive, and add to the size of the swarming colony; and all the bees from the parent colony which had been out before, when they go to the field and circle about would come back and enter the new hive which was on the old stand. Then, on the seventh day when this hive was moved away, the directions said to pick the hive up carefully and move it to a new location, giving it a new stand; and recently we have added this to the direction—not close to any other colony, which seems to be important in some cases. Then the young bees which have learned to fly during the week circle about a bit, and dart off into space, and go back to the new hive on the old stand; thus so depleting the old colony that they were not able to send out another swarm.

Among the first things which beekeepers discovered by an interchange of ideas and by travel and experience was that seasons vary in regard to swarming. Then they noticed that in some location swarming is worse than in others; and I might say that Ontario is in a good place for lots of swarming. Of course you knew that before I told you. In other regions there is almost no swarming. Noting the variation in locations, after a while beekeepers began to think that there might be something else underlying this impulse to swarm beside the reproductive instinct, which had been given as the explanation for all swarming.

What is it that touches off the colony to swarming, leads it on the road to swarming, while another colony standing beside it, apparently to our eyes almost exactly like it, will go through the season piling up a surplus, with no thought of swarming. What was there in the one colony which started them on the downward road, and what was in the other colony which kept it on the upgrade, working for the beekeeper instead of dissipating its forces by dividing it up into several parts?

Some said it was because the bees were prosperous, and because there was a honey flow, and that the best remedy for complete eradication of all swarming impulse is to have a failure. But we do not want that. Bees seem to have sense enough ordinarily not to swarm during a dearth of nectar; and yet sometimes they do swarm when there is almost a dearth of nectar. You may remember some years ago, some beekeepers, down in Texas, where they tell big stories, wrote in one of the bee journals something like this: when the honey flow begins, swarming ceases. You knew that was not true. You knew the man who wrote that was a liar, and many northern beekeepers wrote to the bee journals and said that this fellow down in Texas is all off, because when the honey flow begins, swarming begins.

But the Texas man has been vindicated. Going down there, you find he was telling the truth, and that when the honey flow begins, swarming ceases in his locality. Up in Ontario, when the honey flow begins, swarming begins. Why the difference? It is not all in the prosperity of the colony. Some have said that the size of the hive, or the shape of the hive, the shape of the combs, and various things about the hive, or in the hive, were the reasons for swarming.

It is generally accepted that the large hive, speaking of the brood chamber, reduces the percentage of swarming, under certain management.

At one time it was advised that colonies of bees be installed in attics in order that there should be no swarming—give them a whole room. And when we were foolish enough to try it, out came a swarm from an attic, where they had a whole room in which to build a comb.

In California, a year ago, we were shown two outdoor colonies. Everything is out of doors in California, where they say they do not have any cold weather, but they do. Under the coping of the courthouse, there were two colonies of bees. The combs were beautifully built, straight, probably two feet or two and a half feet in length by about fifteen inches deep. They had all of out of doors in California, and California is a big state, and they could have extended their combs over into the deserts of some of the other states, if they had wanted to. They had all the room they needed to have, and yet one of these colonies, they tell us, is a swarm which came from one of the original colonies which built the out of doors hive there, and settled about fifteen feet away from the parent colony and built their home in the new place.

Now, granted that a larger brood chamber may be conducive to a less tendency to swarm, yet there are times and conditions under which a larger brood chamber actually aggravates swarming. Supposing a brood chamber is large in proportion to the colony, and the colony starts out in the spring with plenty of room for storage and brood chamber, and it has in its blood a tendency to restrict brood rearing while storing in the brood chamber, that little colony fails to expand out into the supers and the first thing you know the colony is confined to the brood chamber, and out of it will go a swarm urged on by the bigness of the brood chamber.

Beekeepers began to see that there was something in one colony, which might look like another colony, which was not in the other colony; that there was something in one season, which might look like another season; something in one location, which might look like another location in many respects; and they reason that even although this is a reproductive instinct which is so deeply seated that it looks impossible to get rid of it, yet there must be some reason for it, if you can dig it out and put your finger on the cause, and thus apply the proper remedy.

Some say it is a taint in the blood, that it is an inbred characteristic. And some years ago we started out with a big noise, saying that we were going to breed queens, in which we would breed out the swarming impulse. We went so far with it that actually some breeders advertised non-swarming queens for sale; and some of us bought those queens. And lo and behold, they lost that carefully bred instinct, and we who bought them lost out. I am not saying that we have not improved. We have bred out a lot of bad things, but we have not bred out the swarming instinct; and I do not believe we will ever entirely eliminate swarming in that way.

Well, what is it that throws the switch and causes a colony to take the curve towards swarming, while another colony, under seemingly similar conditions, plugs right along through the season and stores a nice surplus, in even some of our poor seasons.

The cause of swarming has been known for some time, although not all of the beekeeping public accept the explanation. I say with full confidence that the cause of swarming is now positively known, although, as I say, beekeepers do not all know that it is known.

The cause of swarming, when we analyze every condition that we can find, there is always one condition present, whether the colony swarms because it is a little pinched up by confining its work to the brood chamber; whether it swarms because it is in Ontario, instead of in Texas; no matter what the cause there is

always one condition present in every case of a colony swarming, and that is a feeling of strength in the brood nest itself; or, to put it in another way, possibly we can say a congested condition in the brood chamber; or probably a better way to put it is that a colony has gone far enough, no matter what may be its strength, that it feels it can divide.

The problem is to never let a colony come to such a state of mind, if they reason, that it can say: "We have got to where we are ready for the reproduction instinct to function and to swarm." We have learned methods of diverting the overplus of bees out of the brood-chamber, the brood-next, into other places where we want them, and thus carry the colony along without the swarming coming out.

I am not going into some of the other things which have led up to this positive statement which I have made, that the cause of swarming is now known and that we can apply the remedy, now that we know the cause. But you may remember that some years ago a theory was put out that the cause of swarming is in the nurse bees.

In the January issue of *Gleanings in Bee Culture*, you will find a very startling article by Mr. Allen Latham along that line. He points out where the authority lies in the bee colony; and I wish you would all read that article with great care. He says that the colony is not a democracy but that it is an oligarchy, where the few rule; and he points out the real rulers of the hive. That is in line with this thought, that the swarming was caused by the overplus of nurse bees in the hive.

Going back just a little to the theory of the unbalanced condition of the population in the colony, if I hold before you two colonies of bees, and say, "Here is one colony having three-fourths of its workers for hive work, and one-fourth of them ready for field work; and over here you have another colony which in its development has reached the stage, after the peak of brood rearing, where three-quarters of the workers are ready for field work, and one-fourth for hive work. Which one of those will swarm?" You will at once say, "the colony having three-fourths hive workers, rather than the one with three-fourths field workers.

In Texas they tell a lot of things which are not true, but that beekeeper did tell the truth when he said that when the honey flow begins swarming ceases; and you told the truth when you came back at him and said that when the honey flow begins swarming begins.

In many places in the south the bees do the same thing as in Ontario; they will come up rapidly, but somehow they never quite come up to the Ontario standard of strength. A queen drops off her egg laying, and this happens in relation to the oncoming of spring, instead of in relation to the oncoming of the honey flow. Bees do not know that the chief source of their nectar is alsike or sweet clover. They do not know when their honey flow is coming. When they are bringing up the brood, they are preparing for business when business comes. In much of the south the bees reach the peak of brood rearing, and we have a colony which has a large proportion of hive workers and a small proportion of field workers, when there does not happen to be a honey flow just at that time; the honey flow is some weeks ahead. Then along comes the honey flow, and the colony having three-fourths of its force field workers and one-fourth hive workers, the field workers rush out and gather nectar.

In Ontario your colonies come up with a spurt in the spring, and when they reach the peak—it used to be so, anyway, in Ontario—here comes your alsike and white clover flow, and it hits them when many colonies have three-fourths

of their workers hive workers and one-fourth field workers; and no wonder they swarm. But that is not all. I used to accept this theory completely, as to the unbalanced relation being the cause of swarming; but one season, over in Indiana, I ran against a snag which completely upset me, and that was this, that inadvertently, in the stress of circumstances, a number of colonies were made up of old workers drawn off by moving the hive, so that they all had had a flight and were all old enough for field work; and other colonies were made up of young workers; and in spite of what the books said and what I believed, some of those colonies made up of old workers actually swarmed. They did not obey the rules laid down, they had not read those rules, I guess. But that year these conditions prevailed, which may explain the whole thing. In that year, the clover which was yielding abundantly did not begin to yield until about eleven o'clock in the forenoon, or sometimes half-past eleven; and the weather was awfully hot, we thought. In the forenoon, those bees were all in the hive, and we had to go right ahead with our work because the bees were building queen cells and were crazy to swarm; and, in the forenoon, it was not much pleasure to work in the bee yard; it took a lot of the poetry out of beekeeping to work with them. They put plenty into me. We would open out a hive, and pull out a comb, and on those combs was this peculiar thing. The bottom bar was covered with bees which were there waiting for the signal to go out to work; and the field bees had crowded the young bees up into the brood chamber, and it looked as if they were completely shutting off the ventilation of that hive.

Once in a while we had to pick up a hive in order to do something with it, because there was such a mess on account of their attempting to swarm that I was somewhat at a loss, and I did not feel that the beekeeper was master of his work just then; the bees were the masters. You would pick up a hive and say that perhaps the propolis would hold the bottom board on to the hive; then you would take a couple of steps, and the bottom board would fall off and you would step on it. If you did, you were stepping into something. There were field bees crowded in there by the hundreds of thousands—that is too large a number, but they were there in great numbers waiting for the signal. Who was to give the signal, I do not know; but when it came out they would go with a noise which you could hear a quarter of a mile, as they were going out to the field. You have seen that in Ontario, I am sure.

That year we had the worst swarming that I have ever experienced. The bees were the masters and I was the servant.

The swarming season comes when there is a large proportion of young bees in the brood chamber; but swarming can be induced by bees either young or old having too many of them in the brood chamber.

The remedy for swarming, if it were possible to apply a remedy, is to bring about the condition which I had better describe first. Did you ever start out in an apiary in the morning and walk down a row of hives, when the bees were working well, to look for queen cells in colonies, fighting swarming? You would come to a colony and say, "Oh, this colony is not going to swarm." And you took off the supers and looked at the brood chamber and verified your diagnosis, and went on. You get to another colony and find it is going to swarm, and that there are queen cells in the brood chamber; and you say, "I knew it." Then you might go to the next colony and say, "This one is not going to swarm." And you might go into it and find that a queen cell is being formed. Your diagnoses were right. What did you see when you said to yourself, "This colony is not going to swarm, and that colony is going to swarm?" Before you took off the cover you saw the lack of field activity. When you took off the cover you saw the surplus of bees

in the supers, too many bees in the supers, and you wondered what was the matter there. Then you go down and find bees in the hive instead of in the field. Then what did you see with the other hive, when you said to yourself that that colony was not going to swarm? You saw the bees going out, and bees coming back; and you took off the cover and wondered, "Where are the bees?" Then in the brood chamber, you again say, "Where are the bees?" Several times I have actually feared that a colony had cast off a swarm in my absence, and have gone down into the brood chamber, and have not found a queen cell. The bees are in the field and have no reason to swarm. If you have some way by which you can bring about that state, instead of the other condition, we would have a remedy so that we would become absolute masters of the swarming problem. If we had a way by which we could prevent for every moment of the honey flow congestion in the brood chamber, we could control swarming. Sometimes a little colony swarms. Your little colony, coming up at the wrong time, is in the wrong condition, so far as its proportion of young bees and field workers is concerned, but principally because at the beginning of the honey flow the little colony puts its energies and activities into the brood chamber and not into the supers.

At one time I saw this condition, which no doubt you have seen; a hive body plus a shallow super, as a food chamber; the colony did not winter very well; in the spring there was a little cluster, and they went up into the shallow, extracting super, and started a brood nest there. They had frames of empty combs down below; and they swarmed without ever touching the combs which were down below—empty combs, mind you, because they had built up a condition of prosperity; they had surrounded themselves with honey in front and back, and the little brood chamber five inches high by six or eight inches wide, and were perfectly contented, feeling rich, wealthy, and that they had everything, all the world's goods that they needed. All the activity was in one little spot, and they felt their strength. They were prosperous and were ready to swarm, and swarmed, while having plenty of room in the hive. There was a slight barrier between them, especially if the combs down below were bad; and yet bees do cross such barriers.

Your big strong colony, before the honey flow, expanding into a second hive body and it may be a third one, before the honey flow comes on, is easier to manage during the honey flow than is the little one, because it is ready to expand into the supers, and it is ready and willing to do what you want them to do in attracting the bees out of the brood nest into the upper part of the hive. I do not care whether they go up there to work or to loaf, so long as they get out of the brood chamber.

There is one fly in the ointment. If you can tell me how to prevent the condition which induces bees to stay at home in the forenoon when there is no nectar in the flowers, and to crowd into the bottom of the brood chamber while waiting for the signal to go out, I will tell you how to prevent all swarming in your apiaries; but until you tell me that, I cannot tell you how to prevent all swarming in the apiaries.

MR. ABBOTT: Will you kindly repeat that?

MR. DEMUTH: We know how to get rid of the young bees, how to get the young bees out of the brood chamber and to relieve the brood chamber of the cause of swarming. Now, if you can tell me how to prevent the condition, in an erratic honey flow, of the field bees remaining in the brood chamber until they get the signal to come out, I can tell you how to prevent swarming; but I do not know how to prevent that condition of which I speak.

A MEMBER: Was that in a time of cold nights?

Mr. Demuth: No, unfortunately the nights were hot, and the bees stayed home in the forenoon; and it was terribly hot in the forenoon; and the bees stayed in the wrong place. The colony was actually crowded. In the afternoon they were not crowded. That is a condition which we do not know how to prevent but we can go a long way towards it; but I have not time to go into that and leave any time for discussion. I would rather have a discussion than talk too long.

Mr. Krouse: If you had a six inch space below the colony?

Mr. Demuth: That would help. Dr. Miller had a device which would retard swarming to some extent, allowing a two-inch space under the frames; but it would not prevent swarming completely. All those things must help somewhat in reducing the condition which I have just described.

I forgot to mention one thing, which will fit in very well here. It was said at one time that swarming was caused by old queens. That was before we had discovered the cause of swarming. That got into literature, and you and I read it, as we do read all literature, because you know the printed page gives weight to ideas; and we said, "The way to solve the swarming problem is to send south for young queens, and thus eliminate all swarming. And we actually tried it. We bought queens from the south, and killed our good queens, and replaced them with the young queens in the spring. We re-queened our apiary in the spring, before there was any thought of swarming; and yet those colonies swarmed. Of course there is some basis for the old saying that young queens do not swarm; but somebody revised it later and said first, that young queens do not swarm the first season. Then they said that a young queen raised in this hive this season does not swarm. Then it was said that a young queen raised in this hive and transferred to another hive does not swarm, while a young queen raised in this hive does swarm.

The truth was that the condition is not so much that of the queen, as it is of the colony. If you have a colony in the swarming condition, they will swarm no matter what may be the age of their queen. We have had them swarm ten days after the queen was introduced. The colony, of course, had gone too far on the road to swarming before the young queen had been introduced. The possibility of a young queen preventing all swarming is not dependable, although it prevents some.

What do you do in the spring, what are your swarm-preventive measures? If I size you up right, and I think I do, you started last summer to prevent swarming this coming season. You did not know it, perhaps, but you built conditions as far as you could in order to have next spring, strong colonies early in the season. That is a paradox. You want your colonies strong so that they will not swarm. You want your colonies next spring to be so strong that they will swarm up out of the brood chamber into the supers before the honey flow comes; then you have them where you can get your distribution. I do not care, as far as swarming is concerned, whether they go into the upper part of your hive to loaf or to work, the result is the same, as long as you get them out of the brood chamber into the supers. So you started last fall and you are yet thinking about having your colonies next spring strong as early as you can get them. That is a paradox. If I did not have great faith in your intelligence and experience, I would be afraid to say that.

Then next spring, what do you do? As the colony develops, before it has any chance of getting an idea that it is prosperous and big and wealthy and ready for swarming, you give it a second hive body, containing dark combs. You do not give them a hive body containing light combs unless you are short of dark combs, when you distribute your dark combs, one, two or three in a chamber.

What happens? Your queen goes into the second storey, and she has a new job on her hands. And have you ever noticed the inspiration of a new job? That is one of the wonderful things about beekeeping, you have a new job every day. The queen bee seems to be no exception, as far as the inspiration of the new job is concerned. She goes to the new hive body, and, as Mr. Pettit, I think it was, said, that colony has already swarmed into the new hive body. During the season, you will probably put the queen into the lower chamber so as to know where she is; later on you may leave her with the run of more space, according to your practice.

During your honey flow, you may think you are putting on supers to allow storage room, but you are also putting on supers to pull the young bees out of the brood chamber. You are working for the distribution of the bees; you are working for expansion of your colony, just as fast as it can be expanded. Throughout the season you may think you are putting on supers to catch the honey flow as it comes, but really you are putting them on a little before, if you are an extracted honey producer; and you put them with this food chamber next to the brood chamber, early in the season, so that they will go out quickly and more readily into the supers.

I am going to tell you of some of the preventive measures during the season. You give them more ventilation, giving the colony some shade to protect the hive from the hot sun; and do many things to prevent the feeling of strength or congestion developing in the brood chamber itself.

What do you do with the colony when you find that it is preparing to swarm, when there are more bees staying at home and the colony is becoming contrary?

Some years ago I collected from the literature written in the English language everything I could find pertaining to swarming, and I listed or made extracts from that. In other words, I took a two or three-page article, in which a man described his method of swarm control, and studied it carefully and wrote a little abstract of it. I accumulated a great mass of opinions in regard to the best methods of control, and they were very conflicting, everybody saying his was the best and the others were no good. After a little while I began to see a little daylight in them; and I sorted them; and after a while, how many piles do you suppose there were, when they were sorted out on the basis of likenesses and differences? There were three piles, which later I believe I reduced to two.

As a basis for a remedy or prevention of swarming, a man may have a natural swarm or may make an artificial swarm, which is his method of control; or he may create a condition comparable to the parent colony in nature. Years ago we discovered that parent colonies seldom swarm again the same season. We say that is because they have a young queen. Working on that basis, Elwood and Hetherington years ago worked out a method of building a condition comparable to that in nature, excepting that the working force is all there, but divided into two, three or more colonies. The method was to take out the queen, destroy all queen cells, wait eight or ten days and again destroy all queen cells, and then wait again and introduce a young queen.

Now beekeepers give a rule like this: Kill the queen, destroy queen cells, wait nine or ten days, again destroy every cell, and introduce a young laying queen. There is a condition, I would say, somewhat comparable to the parent colony in nature.

The third way was the separation of the brood and the bees in the same hive. That has been called the Demaree plan, whereby the brood is put on top, or somewhere other than in the brood chamber. But after all that too is only something comparable to the parent colony in nature. But we have a great

difference because we keep the working forces together. But neither of these is altogether satisfactory in a honey flow, either simulating a natural swarm or simulating a parent colony. The latter gives you a longer time. In other words, a newly-hived swarm, in a long honey flow, may recover and swarm again the same season, while the colony which has been de-queened and re-queened with a young queen seldom swarms again the same season.

This brings up the question as to which of these two methods is applicable to our conditions, and which is it preferable to use? I remember one time that your worthy president made this remark, which I have repeated many times, and I have always given him credit for it because he deserves it. He said that before he prescribed he wanted to see the patient. The doctor always does that. He meant that when he is going through his apiaries to fight swarming, before he lays down a rule which he is going to follow absolutely, he wants to see the colony first; and after he has seen the colony and diagnosed the case, he prescribes, and the remedy he applies depends upon the condition present.

One year over in Indiana we had a little spurt from clover and alsike, and the bees started to swarm. I went through and shook everything and made artificial swarms in every case where they had started queen cells at all. That little spurt in clover was followed by a heavy flow of basswood, which lasted eight or ten days. I went home and I said that the only way to manage swarming was by what we have been calling the shook swarm plan, because they piled in the honey beautifully, and the season closed like a snap; and those shaken colonies certainly did give results.

The next season I thought things were just the same, but here was basswood ahead of us, and I went to shaking. That year we had a long clover honey flow; and, strange as it may seem, one man in the neighbourhood of each of my apiaries had planted fields of sweet clover, and the honey flow lasted until September. That year the shaken swarms gave poor results. The re-queened colonies gave good results.

If some supermind should come to us and say, this year you are going to have a spurt from clover, followed by a heavy honey flow from basswood, I would say in extracted honey production, use something like the shook-swarm plan. If you are going to have sweet clover, do not do it. Kill the queen, and re-queen.

After a beekeeper has done everything he can to coax a colony not to swarm and to carry it through without swarming, if they want to swarm in spite of that, do not hesitate to pinch that queen. Find her and kill her.

One of the most important things, which I think is greatly neglected and in swarm-control is vital, is that the honey-producer should be a queen-breeder; and that before the swarming season he should have on hand a great number of young queens ready to put in. This is nothing new to you, but I am simply endorsing your practice. I know nothing better, if you have white clover territory, than to go through your colony once a week or maybe every ten days—you must not make it eleven days, but either nine or ten days, and oftener would be better—doing it regularly. That is a lot of work, but nothing good is accomplished without a lot of work. Go through every hive and kill every queen where they are starting queen cells, destroy every queen cell, then go back in nine or ten days again and destroy all queen cells, and introduce a young laying queen to the colony.

REPORTS FROM COMMITTEES

Resolutions

J. A. McKinnon: We, your Committee on Resolutions, beg to make this our first report:—

1. Resolved, that this association petition the Minister of Agriculture to enforce the registration of beekeepers throughout the province.

2. Resolved, that this association petition the Minister of Agriculture to appoint the apiary inspectors as early as possible in the spring.

Upon motion by Mr. McKinnon, seconded by Mr. Holmes, the report as a whole was adopted.

Exhibits

William A. Weir: The Ontario Honey Producers' Co-operative were given the task of looking after your exhibits at the Canadian National Exhibition. I had the honour of being appointed by you as your representative to the Canadian National Exhibition; so that I will make my report conjunctively.

We had two very splendid exhibits, and everyone was congratulating me on the work we had been able to do. The one exhibit was under the care of the Ontario Agricultural College, and Professor Millen deserves great credit for that exhibit. He secured practically the whole space allotted to the Ontario Agricultural College in the new Government building, on the inside wing. It was well lit up and the whole exhibit was glassed in in front, preventing a great deal of dust from settling on the glass pyramids, which was one of the handicaps from which we suffered in previous exhibits. That was an extensive exhibit, occupying a space thirty-three feet long by twelve feet deep. One end of the exhibit was given to a demonstration of practical extracting, which was carried out by the Department of Agriculture. The centre of the exhibit consisted of several large pyramids of glass, carefully prepared, with plenty of fancy glass, and a model apiary in the centre. The light given on this exhibit was splendid. It was brought about by the use of reflectors arranged at the top edge of the exhibit. On the whole we have to congratulate ourselves upon having that work done for us by the Ontario Agricultural College.

F. Eric Millen: The honey exhibit was staged by E. J. Dyce of the Apiculture Dept., and the credit is his.

We have not secured a permanent position as an association at the Canadian National Exhibition as yet, but we are following that up very closely.

Another exhibit was placed at the Canadian National Exhibition by the Co-operative Company itself, and was built up in the Pure Food building, where two booths twelve by twelve feet were occupied, and honey was emphasized from the pure-food standpoint.

As your representative, I was approached by several beekeepers, especially by members of the Toronto Beekeepers' Association, with a view of trying to arrange for some local competition between the members. I took this matter up with Mr. Waters, who is the chief executive in connection with the exhibition, and discussed it with him; but he thought that in view of the fact that it was a short crop and there would be difficulty in getting a really high-grade honey in exhibition from individual beekeepers, and also because the idea had been just developed, it would be better to leave that over and discuss it further this winter. So that I would recommend that whoever is your representative appointed at this convention should take it up.

Upon motion by Mr. Neil, seconded by Mr. Agar, Mr. Weir's report was duly adopted.

Honey Crop

H. G. Sibbald: The committee met as usual at the date settled on after consulting the members, and with all the information we could get we tried to arrive at a fair price to advise the members for this season. The price has not been quite maintained I think. Perhaps there was more old honey in the hands of the Co-operative than we knew about and that may have influenced it. It would seem, from the crop which we had this year, that we should have had an advance in prices; but we cannot control the market, when there is honey carried over from one season to another, and if we do not know about that, you cannot blame us for having got the price a little higher than was realized.

The President: The work of the Honey Crop Committee has been carried on continuously for twenty-three or twenty-four years, 1903, I think, being the first year, and it has done a great deal of good and has helped the members to a considerable extent. Every year we get criticisms about the date of sending out the report. The situation is such that this committee absolutely cannot please everyone, because of the wide range of latitude and climatic conditions. When one part of the province has the crop off and ready to market, another part of the province is yet early in its honey crop, and to take the report before the crop is nearly all off would only result in misconceptions.

Upon motion by Mr. Craig, seconded by Mr. McKinnon, the report of the Honey Crop Committee was accepted.

REPORTS FROM REPRESENTATIVES

Royal Winter Fair

Mr. Couse: There is not very much to be said at the present time with regard to the Royal Winter Fair. A year ago, Manitoba felt that they should be entitled to exhibit at the Royal Winter Fair. This matter was discussed by an outside committee. Mr. Floyd felt that the Manitoba people should be in a position to come down here and show for small lots. That had never been done for years. Apparently the western people thought we were holding them out because we had not been giving prizes. We had not been giving prizes for ourselves, because we had gone out of that. But this year we felt that to get exhibits from all the provinces would be a very good thing for the Royal Winter Fair, so the management decided that there should be a chance for all the provinces to come in and exhibit.

To make our exhibit too large would not be fair to the other provinces, because they would not care to come here with very large exhibits; so the understanding was that if any of them liked to come in and display five hundred pounds of honey they would be welcome. The fair authorities thought that would be a good thing, to make it a Dominion fair, which it actually is. So all the provinces were invited to come in. However, none of the rest came in, and it left the Royal Winter Fair back on ourselves, and we were not prepared to make the large exhibits which we formerly had made.

Another year, providing the western people or the other provinces do not care to come in, it will be up to this association to make an exhibit which will be a credit to us. This year the exhibit was too small to go on as a big honey show. My idea is that if we are not going to have the other provinces in with their exhibits, we should make a larger and better exhibit because it will be seen more than it was this year. The management of the Royal Winter Fair are anxious to have everything done to bring in an exhibit from every province, because this is a big fair and you have to be liberal all the way through with everyone.

Ottawa Fair

Mr. McKinnon: I am sorry that I have no report ready about that fair. Mr. Gooderham is here and probably can tell us all about it.

Mr. Gooderham: I think there were four displays of about five hundred pounds of honey; and the displays were well put up. There were packages of honey, light to dark; and also some section honey.

London Fair

Mr. White: We met the London Fair Board, and the condition of their finances was such that they had to arrange the entry fee for producers as the prize money. At the same time they promised us, if finances permitted, that they would raise the amount of money for prizes. We had three fine exhibits there this year.

The President: We have to bear in mind that the honey exhibits at the various fairs form advertising which is calculated to help local sales, and is very important.

ELECTION OF OFFICERS FOR 1927

The President: I will appoint Allan Brown and Huber Burke as scrutineers.

The President: Now are you going to take any action in reference to the Committee on Exhibits?

Mr. Agar: I believe, Mr. President, that last year that was handed over to the Co-operative.

The President: Yes, it is on the minutes that last year the putting up of exhibits at the Canadian National and the Royal Winter was handed over to the Co-operative,

Mr. Sibbald: The Honey Exhibit Committee has always been a committee to look after the exhibits wherever an exhibit was asked for. Whether they do or do not put the exhibit up themselves, they are a committee to see that if possible, it is put up, if it is in the interest of the association. It might be that they would ask someone else to do it, but the association looks to that committee to see that the exhibit is put up.

Mr. Somers: Should there not be somebody to look after the judges, too? I think we should see that proper arrangements are made for judging.

The President: I will confess I cannot recall what the precedent is, but why would it not be a good idea to constitute the representatives to the different fairs, who have already been elected, a committee on exhibits or any matter in connection with the exhibits, whether in connection with the appointing of judges or anything else which would affect the association?

MR. AGAR: I would like to make that a motion, Mr. Chairman.

MR. SHARP: And I would second that motion.

(The motion, having been put to the meeting, was carried, and was so declared by the president.)

EXPERIMENTAL WORK IN BEEKEEPING BY THE DOMINION EXPERIMENTAL FARMS

The Dominion Experimental Farms' system now has twenty-five apiaries scattered throughout the various provinces of the Dominion. These apiaries vary in size and the amount of work in each also varies according to the status of beekeeping in the locality or region they serve. During the past summer the total number of colonies in all the apiaries was 718; the number put away for the present winter may even be greater than this.

The experimental work done in those apiaries is all of a practical nature dealing with the problems that confront the average beekeeper. At Ottawa, however, there is a certain amount of research work being done. By this I mean studies are being made regarding bee behaviour in relation to particular activities.

At the present time there are approximately forty-eight projects under way, all dealing with such problems as wintering, swarm control, queen breeding, etc. Some of these projects are being carried on in all of the apiaries, while others are confined to certain localities or regions. It would take too long to discuss all of the projects in detail, therefore I will describe very briefly the most important ones and merely mention others.

WINTERING EXPERIMENTS.—The work under this heading includes the testing out of various types of wintering cases and double-walled hives under the different conditions found in Canada; various kinds and thicknesses of packing material; the testing of honey from different sources as stores for winter and comparing it with sugar syrup; and also comparing outdoor with cellar wintering wherever possible.

There are several types of wintering cases in use at the different apiaries—single, double and quadruple—and, while bees have been successfully wintered outside in them all, it is believed that the quadruple case holding four colonies *en bloc* is the most economical in construction and conservation of heat. It is true that while the single cases or the double-walled hives do away with the time and labour required to pack and unpack the quadruple or double colony case, the extra cost of the cases tend to offset those advantages and the protection offered the colonies is not equal to that of the quadruple case, and moreover is not sufficient in the coldest parts of Canada unless extra thick packing is used, which further increases the cost of protection.

In comparing different thicknesses of packing in quadruple cases at Ottawa, no advantage has yet been found in extra thick insulation. Bees packed in three inches of planer shavings were found to winter just as well as those with six or eleven inches of the same material, but we advocate the use of four inches for ease in packing. It has been found, however, that a good windbreak surrounding the apiary is of the utmost importance in outdoor wintering, even where thick packing is used. An efficient windbreak is worth more than several inches of extra packing. Strong cold winds striking the cases during the winter do a tremendous amount of damage and result in heavy losses.

In testing out honey from various sources as winter stores for bees, it has been proven that early-gathered honey from dandelion and fruit bloom and fall-gathered honey from goldenrod and aster is not safe, especially for cellar-wintered bees. If the winter is short and comparatively mild, outdoor wintered bees may come through in fairly good condition on such stores, but if the winter is long—such as was experienced in Eastern Canada last winter—the colonies will die or become so weakened that they are of little value the following spring. In the fall of 1925 there was a heavy flow of nectar from white goldenrod in Nova Scotia and a number of colonies in the experimental apiary there were put away for the winter on this honey alone. In the spring twenty colonies were dead and the others badly weakened. The colonies that died left as high as thirty pounds of stores in their hives and these were granulated so solidly in the combs that the bees were unable to use them. Not only did this occur in the experimental apiary but also in many private apiaries where honey was the only food given the bees. Even sweet clover and alfalfa honey has been found risky. The experiments show that sugar syrup is the safest food for bees during the winter months and even if the honey already in the hives is known to be of the best quality, it is advisable to supplement it with some sugar syrup.

In comparing outdoor with cellar wintering, it is found that bees can be wintered safely by either method anywhere that bees are kept in Canada, provided, of course, that the bees are well prepared and the cases or cellar are properly constructed. Our results, however, show that outdoor wintering is preferable, because the extra protection afforded during the late fall and again during the early spring enables these colonies to build up much more rapidly than those wintered in cellars. Most cellars now used for wintering bees are unsuited for that purpose and to construct a special cellar that provides the optimum conditions is a difficult and expensive task.

Another experiment that comes under the head of "Wintering," is the wintering over of a surplus of queens. In most apiaries, in the spring of the year there are found queenless colonies or colonies that contain drone-producing or failing queens. It is very often difficult to obtain queens early enough to save such colonies. Experiments at Ottawa and elsewhere have shown that it is possible to winter over a few extra queens to meet this emergency. In the fall of the year, instead of uniting weak colonies in the orthodox manner, they are brought together, two in one hive, with a division of board between them. Such double colonies have been wintered successfully both in cellar and packing cases outside and these extra queens have been the means of saving strong colonies in the spring that have either lost their queen or contained poor queens. This year we are attempting three in one hive,

In addition, some work is being done with double brood chambers, that is, with the food chamber on top. Both deep and shallow chambers are used. Colony temperatures during the winter months is also being investigated.

Swarm Control.—Under this heading there are a number of comparative tests of various methods for the prevention and control of swarming being made, such as requeening colonies in the spring, raising brood, dequeening and requeening, and the separation of queen and brood. The requeening of colonies in the spring and the priodic raising of brood, while reducing the tendency to swarm, do not always keep this instinct subordinate. The separation of queen and brood, or what is known as the Demaree method, or some modification of it, is a valuable one to control a colony that has already made preparations for swarming, but in some localities, especially where there are two flows, one from clover and the other from buckwheat, or where the flow is long drawn out, more

than one application of the system is usually needed. It has been found that the de-queening and ten days later re-queening the colony to be the most reliable method if applied at the commencement of the main honey flow.

The only reliable symptom of swarming is the presence of active queen cells; and to find these in single brood chambers it is necessary to take out the combs and examine them. The large brood chamber is said to reduce swarming. This may be true, but it does not prevent it, for bees will swarm from them—but perhaps not quite so readily—as from the smaller hive. The Division has been working with the divisible brood chamber as a means for rapid and easy detection of swarming preparations on the part of the bees. The ten-frame Langstroth hive, plus a shallow super, offers sufficient room for the best queen, and it has been found that should the colony in such a combination make preparations for swarming, these preparations may be detected by merely tipping the upper part of the brood chamber and looking for queen cells along the lower edges of the upper set of combs instead of examining every comb of the colony.

QUEEN-BREEDING.—This work has been going on for a long time, but, unfortunately, little headway has been made because of the difficulty in obtaining and retaining trained men for this particular work. A queen-breeding apiary has been established at Kapuskasing in Northern Ontario, where queens of selected stock are reared and mated. So far the production of queens has been comparatively small and these have all been absorbed by the Farm apiaries. The queens used for breeding are from high-producing stock that have shown little or no inclination towards swarming. The queens used for the production of drones are also selected with equal care, as it is believed that the selection of the males is just as important as the selection of the females. Great stress is laid on this point by breeders of other livestock. In a later paper I will refer more fully to breeding work.

Various methods of rearing queens are also being tried, so that reliable information may be given to the average beekeeper who wishes to produce at least some queens for his own use. If more beekeepers would do this they would have less trouble from swarming, bad wintering, and, in addition, increase their average production. By this constant breeding and selection from the best we think that the swarming impulse has been reduced at Ottawa.

The Horticultural and Bee Divisions have been working together for the past three years on some pollination experiments. Both plum and apple trees have been used for these experiments. In the spring of the year before the blossoms open, tents are erected around certain groups of trees. Two of the tents are made so as to exclude all insects and one tent to exclude honey bees and all larger insects, but small wild bees can easily gain access to this tent. Just before the blossoms open a large number of these are counted and the clusters tagged and when they are open a colony of bees is placed inside one of the tents that exclude all insects. Single trees are also tented for checks and trees in the open are also used as checks. After the fruit has set, all tagged blossoms are again counted and the percentage set of fruit is ascertained. The results of these experiments have shown that honey bees are the most important agents in the cross-pollination of apples and plums.

Some work is also being done to determine the daily egg production of queen bees. It has generally been accepted that a good queen will produce as high as three thousand eggs per day, while there are some beemen who claim that the average is as high as five thousand. The work at Ottawa does not substantiate these figures. In 1924, the highest daily average for a 21-day period was 2,049, while in 1925 the highest from a like period was 2,234, and in 1926 the highest so

far is shown to be 2,405. The figures obtained at Ottawa are higher than those obtained by Mr. Nolan at Washington. This can be accounted for by the fact that Mr. Nolan made counts of capped brood only, while we counted eggs and brood, and it is possible that some of the eggs laid by the queen do not develop. Dr. Merrill, of Kansas, also worked along this line and his figures closely correspond with ours.

Last year a preliminary investigation was started to ascertain the field force of a normal colony of bees. This year it was continued and, without going into the detail of the experiment, might say that last year the field force of one colony was found to be approximately 31,250 bees; while this year two colonies showed that the number of bees going to the field was approximately 33,125 and 35,312, respectively. These figures were not obtained by actual counting but by weighing the colonies after certain manipulations were made, so that the field force entered another hive on the old location. The figures, however, correspond very closely to those obtained by Parks and Gillette of the U. S. Department of Agriculture, as these gentlemen estimated the field force to be 32,807.

RACES OF BEES.—This test is being made at two of the apiaries only, but next year it is hoped to extend this experiment. There are several beekeepers in Canada who favour the Carniolan bees to the Italians because they think that the Carniolans are better honey-gatherers and will work at a lower temperature. Three years ago an outapiary, consisting of four colonies of each of the above races of bees, was established six miles from Ottawa. Each year the results showed that the Italians led in honey production and gave less trouble from swarming. Last year an apiary was started in Alberta from four packages each of Italians, Carniolans and Caucasians. The results obtained during the past season were as follows:—

Italians stored	220	lbs.	honey	and	drew	out 87	combs.
Caucasians "	80	"	"	"	"	" 50	"
Carniolans "	50	"	"	"	"	" 46	"

Although these figures are for one year only, when coupled with those at Ottawa, would indicate that the Italian bees are the best race.

HIVES.—Tests are also being made of three different sizes of hives, namely, the modified Dadant, 10-frame Jumbo and 10-frame Langstroth hives plus shallow super. So far no advantage has been shown by the larger hives.

OTHER EQUIPMENT.—Aluminum combs have been tested for the past number of years and, while they appear equal to wax combs in the supers, they do not give satisfaction in the brood chamber, even after they have been drawn out in supers.

Different makes and weights of foundation have been tested out under different conditions and in so far as we have tested them the results have shown that combs built on ordinary medium brood foundation properly wired in the frames are at least equal to those built on reinforced foundation.

In British Columbia, where the Kootenay case is in general use, tests are being made as to the value of protection for the brood chambers and supers during the summer months. It is claimed that protection of supers is necessary because of the great difference in temperature between day and night.

In the West, there is an idea that it is more economical to destroy bees in the fall and import packages in the spring than it is to winter bees. To test these claims, package bees of different sizes are being imported at different dates and compared with overwintered colonies.

In addition, there are several other experiments being carried on. Those mentioned in this paper have been touched only briefly and very few results are

given. Should any of you be interested in the work being done at Ottawa and wish to have a more detailed account of it with results obtained, you can obtain the annual report of the Bee Division, free of charge, by writing either to the Bee Division, Central Experimental Farm, Ottawa, or the Publications Branch, Department of Agriculture, Ottawa.

AREA CLEAN-UP IN PETERBOROUGH AND ADJOINING COUNTIES

T. H. Shields

You know we do not all believe in the clean-up system or agree with the system of shaking. But we are all agreed on one thing, which is that if we could eradicate American foulbrood we would cut down by possibly one-half our expenses in the production of honey. I have not the figures of that, but at any rate we could bring down our overhead considerably.

A clean-up area, if it is to be established, must, of course, have certain requisites. The first thing I would like to mention in connection with establishing a clean-up area, is that it must be so situated, call it geographically, if you like, because I am firmly of the belief that you cannot single out any particular county of the province of Ontario to-day and go in there and clean it up, no matter what system you follow—in some counties at least—because it would be almost sheer folly, as the disease has gained such headway and made such an inroad into the apiaries that it would be almost impossible to clean up. But these counties were possibly singled out because they were so situated they had the lake on one side, and on the other side places where foulbrood was not prevalent, making this a good district in which to try out this experiment.

The second thing which you must take into consideration is that in a system such as this clean-up, a county should be prepared for it. The clean-up is drastic, as you will see later on, and you should prepare the county for what is to follow. This was done to a great extent, although the first year we had not the opportunity to do it as carefully and thoroughly as we might have wished. Two counties came into the clean-up area this year which were not in it the first year.

The third thing which is absolutely essential, as I see it, is that you must have the united co-operation of all or practically all the beekeepers within the particular area. How are you going to get that? You can get it by establishing and holding meetings throughout the counties. We held meetings, and the situation was simply placed before the audience who attended them. And by the way I would like to say that they were real representative audiences in all these meetings. If the audience which attended one meeting was not thought sufficiently representative, a second meeting was called in some other section of that particular county to give all the beekeepers a chance to attend. At those meetings the system was explained, and it was talked over; and before any action would be taken, the meeting would be absolutely unanimous that everbody was going in and everybody was behind the system.

The most important is the fourth thing which I would like to mention, and that is that with a system such as this you have to treat everybody alike. It makes no difference whether you are a small beekeeper or a big beekeeper, whether you are a good beekeeper or a bad or indifferent beekeeper, or whether you are rich or poor. In other words, you cannot go into a county and make fish of one and flesh of another. You have got to stand behind your system. There is no

other alternative, because if you weaken for one man you have got to weaken for them all.

A fifth thing which is necessary is that you must have competent inspectors. I am not going to enlarge on the efficiency of our inspection system or of our inspectors; but I will say this much, that you should have good, efficient inspectors, that is, local men. You must have the local men, otherwise, if you bring in an outside inspector, he is doomed. He does not know where the beekeepers are. You tell him such a concession and lot, or such a road, or in such a town, and he loses too much time. You have to be fast, as you all know, so far as inspection work is concerned. While you are on the job you have to work because you have only certain seasons in which you can work. Then you must have competent outside men.

Do not mi sunderstand me and think that this system can be worked out without trouble· You will have your ups and downs, just as you will with any system. You are bound to straighten out any difficulties or wrinkles that crop up. The local man, as you know, sometimes has been criticized for being a little lenient with his neighbour, with some man near him. You want outside men, a certain number of outside men, to help or to be called in, in case the local man meets a situation with which he is unable to cope.

There is one thing I would like to add to it, as a suggestion which will be carried out this year, that even though you may be a competent inspector, an efficient man, whether you be a local man or an outside man, you are going to run into field observations where it is going to be impossible for you to diagnose, and I think you men who have been on inspection work will agree with me, and the larger commercial men, that there are times when it will be impossible for you to say whether a particular trouble is American foulbrood or European foulbrood. That is, that there may be symptoms present which will make you uncertain. To be absolutely sure, you should take a sample out of the comb, send it either to the Provincial Apiarist or to the Dominion Apiarist at Ottawa and have it analyzed.

I am frank with you when I admit that I have run into cases where I could not tell, and where I do not believe that there was any man who could tell without the aid of a microscope. That simply means that if you meet such a situation, your work is going to be delayed, and the success of your programme may be interfered with considerably, if you wait two or three days. We run into beekeepers who are only lukewarm over the idea of the clean-up. If you have an outside, competent man, you can carry a microscope. I hope that this year this work will be carried on and if Mr. Jarvis again will be in charge of the work, and that he will have a microscope with him, so that we can make observations and have a certainty without waiting the length of time required before a report is made and received from Guelph or Ottawa. There is a possibility that when a sample reaches Guelph, Professor Millen may be away and there might be nobody in the office who could say, and you might have to wait for a few days.

This year we had the opportunity of using a microscope in one of the provincial laboratories, and that helped us wonderfully.

Another thing is that you must have adequate funds to carry on a system such as this. We have been handicapped due to the fact that funds have run out just at a particular time, when we hated to have the inspectors called in; and in a great many cases the inspectors carried on without coming in, because they were willing to work for nothing.

I would like to say this, with all due respect to the staff of inspectors which are in this clean-up area, that they all have this work at heart. Of course they

were interested in the money they received. You all know it is pretty hard to get an efficient man out on inspection work, especially if he is a commercial beekeeper. The $5 a day remuneration which he receives is nothing to him, because he may lose $10 a day at home. But it amounts to this, that while a particular inspector may not be out for the small remuneration of $5 a day, I think I am safe in saying that all our inspectors were also out to help themselves in getting the district cleaned up.

As to the cost of this thing, while talking about funds you may think it costs considerable to carry on this campaign. As a matter of fact I do not believe it cost one cent more than was spent in the average county. I was unable to get all the figures on that; but, approximately speaking, there are fifty counties in the province. We had a grant of $15,000, which would average $300 to the county. Inspection was not carried out in all those counties, so it was rather a hard thing to tabulate the exact results in each county in which inspections were carried out.

Last year, the second year in which the clean-up was in operation, a certain sum was set aside for the clean-up area, that is, $1,500; and we had seven counties in this clean-up area. If you average that up, it does not amount to anything like the $300 average for the province. That is as near as I can give you regarding the exact costs.

I would like to give you a short idea as to how this clean-up actually worked out. As I say, all the counties agreed unanimously to this programme, which I will outline, of a drastic clean-up; and that simply meant that the beekeeper was allowed to treat his colonies or do whatever he liked with them before the inspector arrived.

To those who support the shaking system, which we have had before, I would say that I am not discrediting it at all, and am not saying it has not done good work. The only thing is that it looks to me as if it might have done better work, because some of you old beekeepers can remember, back twenty years ago, when this system was inaugurated, that foulbrood was limited to a very small number of counties in the province. I have been told by one of the old beekeepers that you could count the number of counties affected in the province. Now American foulbrood is in practically every county. This shows that we have not been eradicating the disease while possibly we may have controlled it. The weakness in shaking is the fact that no matter how efficiently you do it, when you shake the bees from the frames, you are shaking hundreds or possibly thousands of young nurse bees that have never been outside the hive before, and they go back into any hive, whether into their own or into the one next to it, and possibly carry with them the disease germs in the honey which they have, and which in turn they feed directly to the larvae in the hive into which they go.

Some may say that that could be prevented by using a tent over the colony which you are going to shake; but that is rather complicated, and it would be almost impossible for the ordinary beekeeper to do it.

The inspector comes into a clean-up area and comes to your apiary. He examines your colonies, and if he finds American foulbrood, he marks the government sign on it, condemning the colony; and he goes on to the next apiary. He may visit four, five or six apiaries in a day. We generally like to have inspectors work in pairs, because it speeds up operations, and one man is a check on the other, and if strong opposition is met with, the inspector is better prepared to cope with the opposition. You do meet with opposition, but in all the opposition we have had in the seven counties, we have never yet had to bring in the arm of the law, but we have reasoned with the man and obtained his consent. If you

bring in the arm of the law and destroy a man's colonies, you have destroyed his co-operation; but if you reason with him, and make him see where it will be to his benefit to clean up, then you have got a true ally.

As I say, the inspector may inspect several apiaries in a day. Then he doubles back in the evening to burn the colonies that he has marked with the sign of American foulbrood. Possibly this is where the expense has been kept down, because the inspector oftentimes does two or three days' work in one, because he may be working until the small hours of the morning in carrying out the burning, and of course he could only get the one day's pay. He leaves nothing for the beekeeper to do. Very often the beekeeper will turn in and help the inspector to dig the hole in which he is going to burn up the bees. That is true co-operation by the beekeeper.

A hole is dug in the ground of a size depending upon the number of colonies to be burned, and the fire is started in the hole. You want to be sure that you have plenty of wood to keep the fire going, because after you dump on a whole lot of comb and dead bees you may have difficulty in keeping the fire going. The reason for this digging of the hole is so that if there is any comb left after the fire, the hole may be filled in and there will be nothing left on the surface of the ground.

The colonies are not smothered until night. In the evening, when the inspector doubles back, he plugs up all the crevices of the hive, and smothers the colony with gasoline. Only the colonies and the brood-combs are burned. Super-combs are allowed to be treated with formalin and water. The work is carried out by the inspector, and nothing is left for the beekeeper to do. It is all done under the immediate attention of the inspector. If in previous years the inspector had done all the work, possibly we might have made more progress.

You have wondered how this clean-up works out, and I am going to give you the actual figures. I want to say that while this has only been in operation two years, in the first clean-up area, the beekeepers in that particular district really have accomplished something. Taking the counties which were in the area for the first year in 1925, Peterborough county, the number of colonies examined was 1,256. The number of colonies found diseased with American foulbrood was 130. The number of colonies treated, none; because we were not allowing treating; our whole idea was against the treating system entirely. Colonies destroyed, 130.

I think I can say that if we had dreamed that some of these in the clean-up area were as badly infected as they proved to be, it may be doubtful whether we would have had the heart to enter into it at all. But I firmly believe that, after a short time, if this system is found successful and is inaugurated in the counties which were not badly infected, you could push the disease back into the counties which have been the worst infected. I do not think it would do to start your clean-up in the counties which are worst infected with the disease, and let it spread to the others; but go into the counties which are not so badly affected and deal with it there.

Let us now compare Peterborough county results with those of the first year. The total number of colonies examined in the second year were 1,235; number of colonies found infected with American foulbrood, nine. And right there I wish to say that two of the yards in which disease was found, the trouble could be directly traced back to a source that was not found the first year. It was rather hard to find the source. The particular case was that of a man who had been put out of business years ago by American foulbrood, and he still had a number of old combs stored in an old shed; he had not used any of his supplies

for a number of years. The man next door found a swarm in his orchard, and not knowing that his neighbour had had disease, he had gone across and got a hive filled with frames which were full of foulbrood, and into this he put the swarm. The swarm died out during the winter.

When we got to this place, we found bees going in and out, and we thought we could directly trace the source of infection back to that killed-out apiary. We have now accomplished something in that case.

I may tell you that in Peterboro county, in one man's yard alone, we burned 58 colonies out of 78.

In Hastings county, the number of colonies examined was 1,519; colonies with American foulbrood, 173; colonies treated, none; colonies destroyed, 173. Part of Hastings county was not covered the first season, due to the fact that we had an insufficient number of inspectors for the job, and we had a lack of funds. Therefore we cannot compare the whole county in this next year; but, comparing the part of the county that was examined the previous year, we find this result: Colonies examined, 678; colonies affected with American foulbrood, none; colonies destroyed, none.

Now, taking the case of Northumberland county. In 1925 the number of colonies examined was 1,502; colonies found to be affected with American foulbrood, 282. Then there is one thing which is special here: Colonies treated, 11. That was due to a misunderstanding of one inspector who misunderstood his instructions and treated eleven colonies in one particular section before we found it out and had it stopped. The number of colonies destroyed, therefore, was 271 instead of 282. As a result of that misunderstanding and treatment of those colonies, in 1926 we found, after examining 3,061 colonies, 86 colonies affected with American foulbrood. That is, the previous year we had 282, while this year we had 86; 58 of the 86 which we found this year were diseased colonies in the section where the eleven colonies had been treated.

MR. SOMERS: How were the eleven colonies which had been treated?

MR. SHIELD: I cannot answer as to whether they were badly or not badly affected. They were treated by shaking.

MR. SOMERS: In the re-examination, did you find the eleven to be all right?

MR. SHIELD: I cannot say. I know the disease was found in the yard where the eleven colonies had been treated, but whether the eleven colonies which had been treated were among those found with the disease, I do not know.

MR. SOMERS: The way we do it is that we take the hive in the evening, take it inside and treat it, and leave it inside for two days.

MR. SHIELD: That may work out well with you. But it has got to such a stage now that you could not rely upon shaking being properly carried out. How many of you beekeepers ever saw a perfectly tight bee-house? When you shake your colonies inside, how many of your bees get outside?

In Durham county we examined 631 colonies, and found 32 diseased; and 32 colonies were destroyed, in 1925. In the second year, in this particular section, only one colony was found with American foulbrood, where we had found thirty-two the season before.

The totals of all our counties that we have worked in for the two years are as follows: The first year we examined 5,003 colonies; found 617 diseased, and burned 606. As I said before, the eleven were treated through a misunderstanding. Then for this year, we examined 5,168 colonies, found 96 colonies diseased, and the number destroyed was 96. The figures are compiled from the

data of the inspectors' reports which have been sent in to the Provincial Apiarist.

Even though we follow such a drastic system as this, it is no use unless we keep it up. The Government has co-operated with us to this extent that at the present time they have placed a quarantine upon our seven counties, on bees moving into those counties. Whether you are coming from a disease-free area or from an area where there is disease, you are not allowed to move bees into our seven counties. We have found the result of that quarantine already. One man had gone so far as actually to go into one of these counties, moving from a county which was not in the clean-up area, and had the idea of moving his colonies into our area. But the Provincial Apiarist's Department at Guelph stopped it. We are always able to fall back upon the Department at Guelph, which fostered the idea and has given us great assistance in what has been done.

REPORT OF THE PROVINCIAL APIARIST FOR 1926

The winter of 1926, together with spring loss, was the heaviest in Ontario for several years and the total honey crop was considerably below the average, due not alone to the smaller number of colonies, but to the very unseasonable weather experienced during both the light and dark-honey flows. These conditions made apiary inspection a difficult matter this past season.

There were 119 apiary inspectors appointed and the apiary inspection figures show that the beekeepers throughout the province are beginning to appreciate that elimination of American foulbrood is a serious matter and that destruction of the contents of infected colonies and treatment of other infected material is the only sure means of finally controlling this destructive disease.

During the year the clean-up campaign has been introduced into the counties of Middlesex, Wentworth, Victoria, Lennox and Addington, and Renfrew, and good work was done in these counties.

The counties of Simcoe, Oxford, Haldimand, Bruce, and Ontario have petitioned for a clean-up campaign to commence in 1927 if possible. The beekeepers of York county passed a resolution in favour of a clean-up campaign, provided recompense be given for destroyed infected colonies.

The inspectors for the city of Toronto have been working on the clean-up plan for the past two years and report conditions much improved over those previously existing.

Apiary inspection in Ontario still presents many difficulties, the most noticeable being the impossibility of securing sufficient inspectors of experience to carry on the work in the most efficient manner.

After fifteen years' work with apiary inspection in Ontario and two states across the line, experience shows that the only certain method of eliminating American foulbrood to the point where it will do little damage, is destruction by the inspector of the contents of all infected colonies. Educational methods alone, with the choice of treatment left to the beekeeper, simply means a spread of the disease, because so many beekeepers will attempt to save some of the infected material and carry over the disease-infected colonies until some time later in the season. Inspection of apiaries in Ontario has been in operation for the past twenty years and for the greater part of this time beekeepers were

allowed to treat disease-infected colonies, with the result that American foulbrood has spread to many places where it did not previously exist and has caused many thousands of dollars loss to the beekeeping industry.

A striking example of what a clean-up campaign will do in two seasons is seen in the counties named below.

CLEAN-UP AREA

COMPARISON BETWEEN 1925 AND 1926

*Areas where clean-up system was carried out last year, 1925.

County	Colonies Examined	American Foulbrood	Colonies Treated	Colonies Destroyed
Peterboro	1,256	130	0	130
Hastings	1,519	173	0	173
Northumberland	1,502	282	11	271
Durham	641	32	0	32
Prince Edward	85	0	0	0
Totals	5,003	617	11	606

SAME AREAS 1926

County	Colonies Examined	American Foulbrood	Colonies Treated	Colonies Destroyed
Peterboro	1,235	9	0	9
Hastings	678	0	0	0
Northumberland	3,061	86	0	86
Durham	169	1	0	1
Prince Edward	25	0	0	0
Totals	5,168	96	0	96

*This report does not include Townships of Hungerford, Elzevir and Madoc in Hastings County, or Clarke, Darlington and Cartwright in Durham County, as this territory was not worked in 1925, for lack of time and funds. Complete summary is shown in work completed in 1926 apiary inspection.

Through a misunderstanding treating was allowed for a while in one area in Northumberland county this year. Fifty-eight of the eighty-six diseased colonies were found in this section this year.

The following is a complete summary of the apiary inspection work for 1926:—

SUMMARY OF APIARY INSPECTION, 1926

County	Colonies Examined	Colonies with American Foulbrood	Treated	Destroyed
Brant	130	69	....	77
*Bruce	1,609	167	91	90
*Dufferin	289	5	....	5
*Durham	1,101	91	....	91
Elgin	548	139	4	71
Frontenac	308	1	....	1
Grey	1,489	125	41	63
*Haldimand	526	19	....	10
Halton	78	6	....	6
*Hastings	2,556	477	....	477
Huron	4,597	138	18	119
Kent	527	61	....	41
*Lambton	710	32	....	25
Lanark	1,148	106	....	85
Leeds	59	3	....	3
*Lennox and Addington	545	9	....	9
Lincoln	479	13	4	9
*Middlesex	1,507	877	....	879
Norfolk	448	189	....	10
*Northumberland	3,061	86	....	86
*Ontario	1,219	123	15	95
*Oxford	731	23	1	16
Peel	840	74	5	43
Perth	307	12	....	12
*Peterborough	1,256	9	....	9
Prescott	171	....	....	....
*Prince Edward	25	....	....	....
*Renfrew	581	21	....	10
*Simcoe	1,475	245	102	121
*Temiskaming	243	....	....	....
*Victoria	1,163	106	....	106
Waterloo	952	38	15	22
*Welland	700	61	....	61
Wellington	1,318	81	4	52
*Wentworth	3,911	314	....	275
York	3,759	414	104	205
Totals	40,366	4,134	404	3,184

*These counties are in the clean-up area for American foulbrood or have petitioned the Department to come in during the 1927 inspection season.

Thus far this year $4,161.00 has been received from beekeepers for registration of apiaries.

The Minister of Agriculture increased the apiary inspection grant for the season of 1926 from $9,000 to $15,000, thereby enabling us to carry on the inspection work for a longer period and to cover more territory than would otherwise have been the case. The thanks of the beekeepers of the province are due the Minister for his continued interest in the beekeeping industry.

The future policy of this Department should be to confine the apiary inspection largely to clean-up areas and inspecting in other places only where necessity arises. The Department always endeavours to attend to special cases where the funds are available and the call is received during the active season, when inspection work is possible.

The securing of permits to move or sell bees is proving very satisfactory and has been the means of preventing disease infected colonies or supplies being shipped to clean areas.

The quarantine in the central eastern counties clean-up area has been much appreciated by the beekeepers in those counties and with their co-operation means that American foulbrood will not be imported from outside areas. The quarantine does not prohibit the bringing in of package bees or new supplies, but refers only to colonies of bees and used apiary supplies.

Further experiments, in treating American foulbrood infected combs, have been carried out and will be continued over another year when final conclusions should be reached, so far as the value of the formalin water treatment is concerned. Mr. Jarvis will give particulars of this Thursday morning.

REV. E. E. LAKE: Mr. Chairman, it gives me great pleasure to move a vote of thanks to the Honourable the Minister of Agriculture for the increasing of the grant to $15,000, and the help received in combating and endeavouring to get rid of disease.

M. B. HOLMES: I second the motion.

(The motion having been put to the meeting, was carried, and was so declared by the President.)

CEREALS AND HONEY

MARY I. BARBER

Kellogg Company, Home Economics Department, Battle Creek, Mich.

There is no food whose name brings to mind romance, fragrance, flavour, and texture so vividly as honey. And no wonder when honey is made from the nectar of blossoms and has a historical background dating from remotest times.

Years ago honey was attributed with mystic qualities. It was one of the main ingredients of the concoction brewed by Circe, which, when drunk by man, made him forget all he loved. In early times honey was served with locusts, with oatmeal, and with spring onions. It was thought that honey and young onions eaten before breakfast would assure good health!

From this we see that a combination of cereals and honey is not a new idea. Both of these foods furnish heat and energy to the body. The flavour of honey improves the bland taste of cereals. Honey, although less sweet than sugar, makes up for this lack by its flavour. It also contains valuable minerals and is slightly laxative, so provides a superior sweetening for cereals.

The Kellogg Company is very proud to be affiliated with the beekeepers throughout the country and we thank the Ontario Beekeepers for inviting us to be present at the annual meeting.

Mr. W. K. Kellogg is personally interested in an increased consumption of honey. It is being used in his home both on the table and in cooking for a sweetening, and he praises it as a health food. It is through this conviction that Mr. Kellogg has arranged for co-operation between the organization of which he is president, and the honey producers. From now on each package of Kellogg's cereals will carry the suggestion that cereals are delicious when served with honey. The output of the Kellogg plant averages nearly two million packages a day. In addition to this, honey will be mentioned in newspaper and magazine advertising

displays picturing both cereals and honey and will interest the dealers in spreading this menu suggestion among their customers.

The Home Economics department will distribute recipe books, diet pamphlets and honey circulars to teachers, housewives and health workers, and will use honey in cooking demonstrations.

The Kellogg Company desires to work closely with the beekeepers. In connection with exhibits at medical, dietetic, and other professional conventions, we will feature honey along with cereals. We hope that you will keep us informed of new recipes, new ways in which you are marketing your product, and other points which we can incorporate in our work.

EXPERIMENTS WITH CHEMICAL SOLUTIONS, 1926.

G. L. JARVIS.

This is the third year in which we have carried on rather extensive experiments in treating combs infected with American foulbrood. In coming to certain conclusions with regard to the chemical treatment of diseased combs, the practical application has always been the most important consideration. If, therefore, the conclusions have appeared somewhat inconsistent on certain points, this is likely the reason for it.

The experiments this year were quite different from those of the two previous years, with the exception of one experiment. The object of this change was to find out, if possible, the most simple method of treating super combs and other equipment which might possibly be contaminated with bacillus larvae spores, to make the work of the inspector more definite—to find out just what is dangerous and may cause re-infection and that which is safe to leave for future use by the beekeeper.

American foulbrood cannot be detected by the naked eye, except in cells where brood is being reared. Therefore, super combs and other equipment are difficult to experiment with, without definite knowledge that the disease is present. To overcome this difficulty an inoculating syrup was made up containing millions of bacillus larvae spores. These spores were obtained from scales found in brood combs. The super combs used were from diseased colonies with the honey extracted, but the combs not cleaned out. These were also inoculated with the syrup, so that each comb would have thousands of spores added to it. They were then allowed to stand for ten days before treating. This would give the syrup a chance to become well incorporated with the honey already in the combs.

In the experiments with super combs we used as far as possible half dark combs and half light combs.

Experiment 1.—Super combs, inoculated. Treatment: Combs immersed in 10 per cent. formalin, 90 per cent. water for 24 hours. Results: No disease appeared.

Experiment 2.—Super combs, inoculated. Treatment: Combs washed with 10 per cent. formalin solution by means of a watering can and extracted immediately. Results: No disease.

Experiment 2a.—Check on strength of solution. Super combs inoculated. Treatment: Immersed in 20 per cent. formalin solution for 24 hours. Results: No disease.

Experiment 3.—Super combs, inoculated. Treatment: Immersed in plain water for 24 hours. Results: 50 per cent. re-infection.

Experiment 3a.—Super combs, inoculated. Treatment: Washed under tap and water extracted from combs. Results: No disease.

Experiment 3b.—Super combs, inoculated. Treatment: Washed under tap and allowed to stand 70 hours before extracting. Results: One colony—one diseased.

Experiment 3c.—Super combs, inoculated. Treatment: Immersed in water for 70 hours, then extracted. Results: 50 per cent. diseased.

Experiment 4.—Check on inoculating syrup. Super combs inoculated. Treatment: None given direct to the bees. Results: 100 per cent. A.F.B.

Experiment 4a.—Super combs, inoculated. Treatment: Subjected to direct rays of sun for two days (care being taken not to melt combs). Results: 100 per cent. A.F.B.

Experiment 5.—Brood combs with scales removed by immersing in water and drying. All scales shaken out and others picked out. These combs were then washed with a 10 per cent. formalin solution. Results: One colony showed disease in this experiment.

Experiment 6.—Same as No. 5 except that the combs were immersed in the solution for 24 hours. Results: No disease.

Experiment 7.—Cancelled.

Experiment 8.—Check. Scales removed and given to the bees without further treatment. Results: 100 per cent. diseased.

Experiment 9.—Brood combs containing scales with capping removed and treated with 20 per cent. formalin to 80 per cent. water and immersed for 48 hours. Results: No disease.

Experiment 10.—Four healthy colonies placed in the experimental yard to check outside conditions. Results: No disease.

General Results

1. No disease appeared after inoculated super combs were treated with a 10 per cent. formalin solution.
2. One case of disease re-appeared where scales were to a large extent removed and combs treated with a 10 per cent. solution of formalin.
3. When the inoculated super combs were washed or immersed in water only, 50 per cent. of the colonies so treated showed American foulbrood.
4. In all the check colonies where inoculated super combs were given direct to the bees, disease appeared in a short time.
5. Direct rays of the sun had no affect in destroying bacillus larvae spores.

Conclusions

This year's experiments indicate:

1. That a 10 per cent. solution of formalin is sufficient to kill bacillus larvae spores when these are in the free state as found in super combs which do not contain scales of American foulbrood.
2. That a 10 per cent. solution of formalin is not strong enough to kill massed spores as found in scales or small pieces of scales.
3. That super combs (without scales) with honey extracted must have a very high spore content to start the disease.
4. That dry super combs are safe to use again if no scales are present.
5. That scraping and washing with water is sufficient for hive-bodies, floor boards, covers and other pieces of equipment from diseased colonies.
6. That wet super combs from diseased colonies are safe when immersed in water for 24 hours, unless the honey has an extremely high spore content. This, however, needs further proof. We should also have some co-operative experiments to supply definite proof. Also more definite information should be obtained in an experimental way.
7. Sunlight does not destroy bacillus larvae spores, which indicates how careful we should be in handling a solar wax extractor, especially in a diseased area.
8. It takes at least a 20 per cent. formalin solution with a 48-hour immersion to destroy massed spores as found in American foulbrood scales.

These experiments have led up to other work which will be carried on next year and which we believe will decide in a more definite way just what material

with a simple treatment which can be applied at once and that which must be disposed of at the earliest possible moment. This should make inspection and eradicating measures more definite in character and results.

MR. MARSH: What is the surest indication of American foulbrood? Is it ropiness?

MR. JARVIS: No. The only constant indication is the tongue sticking up in the air. In one part of the Province, European foulbrood was all capped over, and roped out.

MR. DUNN: Many of us know that European foulbrood will give the appearance of American foulbrood, in the decaying stage. Can you tell us if an amateur can tell the difference between European and American foulbrood, when they are so similar at a certain stage?

MR. JARVIS: No, excepting that in most districts European foulbrood shows up before the cappings are put on—at least enough of it to give you a good idea as to what it is. It is the exception which proves the rule, and you will come to a case where the larvae is perfectly straight, as in American foulbrood; then look for the marks of the trachea; in most cases they show up, but sometimes they do not. We put it under the microscope and make the final determination. In certain districts European foulbrood is about 90 per cent. in the capped stage; as you get away from those districts it begins to show up more in the uncapped stage. I do not know whether Dr. Phillips could give any reason for that?

DR. E. F. PHILLIPS: Our experience with capped European foulbrood is that nearly always it is material which has been there for a considerable time without having shown up very much; and after two or three years of it we will get a lot of capped material. In European foulbrood territory, you get a marked difference in its appearance, not because the disease has changed, but because of the difference in the cleaning out.

A MEMBER: What is the consistency where the tongue is sticking up?

MR. JARVIS: It is ropy.

I desire the members of this Association to remember about co-operating with us in our experiments next year. If you have super-combs, especially those which are wet, from diseased colonies, I wish you would let me know. I believe others who are doing more work than I am in this line are getting the same results. Dr. Hutzelman has made all this chemical work possible, and we owe a great deal to him, because everything which has followed has been due to the original discoveries which he made.

I wish you also to specially bear in mind that we have not completed the work which we are doing in these experiments.

R. HAROLD THOMPSON: I would like to ask Dr. Phillips if there is any possibility of European foulbrood germs carrying over in the brood nest from year to year?

DR. PHILLIPS: The work that has been done on the bacillus pluton indicates it is killed by drying in two or three months at the most; and yet in some mysterious way it does carry over from season to season, although no one has been able to find out how. European foulbrood starts off in an exceedingly mild and invisible form; that is, the first brood does not indicate its presence. This shows that the number of individual organisms has been considerably reduced, and it takes considerable time for their development.

MR. DUNN: European foulbrood cannot live in honey more than a few days?

DR. PHILLIPS: As far as we know, only two or three days.

THE PLACE OF THE AMATEUR IN BEEKEEPING.

DR. E. F. PHILLIPS.

While I realize the similarity of conditions in Ontario and in New York State, so far as beekeeping is concerned, I also realize that it is not appropriate for one from another political unit to come to Ontario to give specific advice on questions which concern commercial matters. This discussion was originally prepared for presentation at the Empire State Federation of Beekeepers' Societies which meets next week, and in presenting it here, I have made no changes whatever, even to references to local matters. I hope that it will be accepted as a message to New York beekeepers, and if it has any application to conditions in Ontario, my hearers will be better able to make this application than I.

There is no need, however, to evade the fact that conditions in production and marketing of honey and in the development of beekeeping are almost identical in Ontario and in the northern states, so there is strong reason to suspect that whatever has caused present conditions, it is found in both places. Present conditions in beekeeping are complex and they are becoming more complex year by year. There may be more than one way to solve the problems which are presented to us and I am not offering solutions to all our difficulties.

The extensive development of commercial beekeeping in the United States dates roughly from 1906, the time of the passage of the Federal Food and Drugs Act. Before that time there was a considerable number of persons who devoted their entire time and attention to beekeeping, but since that date, with the protection offered by the rigid enforcement of this law, progress in commercial beekeeping has been marked. Extensive beekeeping as we now know it is, therefore, relatively new, and the greatest advance within the past two decades has been made in those parts of the western states where opportunities for the keeping of large numbers of colonies are unusually good, but which are far from the honey markets.

Previous to 1906, the greatest marketing problem of the beekeeper was caused by the unfair competition of adulterated honey on our markets, making it difficult for the honest beekeeper to market pure honey at a fair price. This dishonest practice ceased after the passage of the Food and Drugs Act and does not now exist, and immediately after the passage of that law, there was comparatively little difficulty in marketing honey, while prices for honey were for some years after that time somewhat better than they are now, if we compare the prices on the basis of the purchasing power of the money received for the crop, rather than in actual cents per pound.

The Great War brought about a large demand for honey, both for export and for domestic use. It is important to note that at this time honey was used chiefly as a substitute for sugar, a condition which normally does not exist in honey markets, so that the war demand was decidedly an abnormal one. This demand greatly encouraged beekeepers and led to a rapid expansion of commercial beekeeping, more rapid than occurred before that time. While good prices obtained during the war were a financial help to commercial beekeepers, the decline in prices since that time have destroyed any excess profits and we are now paying our share of the cost of the war. The temporary demand for honey ceased almost as soon as the war closed, and since that time there has been increasing difficulty in marketing honey, until to-day the marketing problem is universally recognized as the outstanding problem in beekeeping. Numerous

organizations to solve or to alleviate this new phase of the marketing problem, but it will doubtless be admitted that we are about as far from the correct solution of the problem now as at any time since it first developed. The present discussion is not an attempt to solve this problem but is only an attempt to analyse recent trends in beekeeping which may have a bearing on the causes of the present marketing difficulties. There is some reason to think that we have at times attacked the marketing problem entirely in the wrong way because some of these factors have not been considered.

It was formerly the policy of all beekeepers, with the exception of some car-lot producers in the far West, to market their honey locally or through their own efforts within a few miles of the point of production, and when this was done it made little difference to a beekeeper what the wholesale price of honey was. The extensive development of beekeeping in the West, where there are not enough people to consume the crops produced in good years, and the enlargement of the production of individual beekeepers in certain favoured regions of the East to the point where the producer cannot sell his own honey locally seem to be the two outstanding factors which have brought about the present market conditions. These two things have made it necessary for an increasing number of large producers to depend on the wholesale markets for the distribution of their crops, and the wholesale markets have proved wholly inadequate to handle these crops at prices which make honey production profitable.

During the war, when there was a large demand for honey for export and as a sugar substitute, there was no trouble in selling a large crop through wholesale channels. When the foreign demand ceased immediately after the signing of the Armistice, the wholesale market collapsed, and matters were made far worse because of the influx of honeys from the West Indies, all of which entered the wholesale markets. The commercial producers in all parts of the country had great difficulty in 1919 in disposing of their crops, and if it had not been for the selling of enormous quantities of honey at road-side markets, by parcel post and through other means which kept honey away from the wholesale markets, the wholesale markets would have been so flooded with honey that it would have been impossible for a commercial beekeeper to sell at a price which would permit him to remain in beekeeping. Great credit is due the bee journals for calling the attention of beekeepers to the necessity of selling honey locally, and the response of beekeepers to this suggestion saved beekeeping from a serious decline. This was properly looked on at that time only as a makeshift, as a means of saving an immediate situation, but it was a great success. The man who did more than anyone else to bring about this result was Mr. George S. Demuth, who from the first saw what was happening and gave timely warning.

The present marketing problem arises from the inadequacy of the wholesale markets, and it therefore appears that any effort on the part of the beekeepers to solve the marketing problem by placing still more honey in the hands of wholesale dealers tends only to make matters worse. There may come a time when there will be a wholesale market which will be able to handle the commercial honey crop, but that time has not yet arrived. At this point almost every effort of co-operative marketing societies of beekeepers in the United States has largely failed, for while it might be possible for a co-operative movement to divert honey from the wholesale markets, most organizations have worked entirely on the policy of placing still larger amounts of honey on the already overloaded honey markets in Chicago, Kansas City and New York City. The Texas Association is almost the only such organization which has aimed at distribution solely within its own state, and it has been so successful, in spite of the large production in

For some years, and in fact especially since 1906, it has been the policy of the Bee Culture Laboratory of the Bureau of Entomology, of the colleges of agriculture where beekeeping is taught, of all the important bee journals of the country, of all important societies of beekeepers and of virtually all individuals interested in the proper development of beekeeping in the United States to advocate and to encourage the extension of beekeeping along strictly commercial lines. We have aimed to make beekeeping more important by the production of our honey crop by a smaller number of commercial beekeepers with suitable training, experience and equipment for such work, rather than by a large number of persons who each own only a few colonies. The extension work in beekeeping, begun by the Bureau of Entomology in 1916, just before the United States entered the War, was for a time opposed by some of the commercial beekeepers of New York and other states, through a fear that such work would result in the creation of a large number of small beekeepers, a policy which would have been at discord with the other policies for the development of beekeeping. It is clear from the records and history of the extension work, now covering a period of ten years, that it has resulted everywhere in a reduction in the number of beekeepers, not in an increase. The extension men have urged the poorer beekeepers to dispose of their bees to those who would care for them properly and have urged the better beekeepers to buy up neglected colonies wherever possible. Their advice in this line was especially definite during the War. They have constantly taught that the desirable development of modern beekeeping is commercial production, so that the fear of commercial beekeepers some years ago has not been realized. There is actually a smaller number of beekeepers now than at any time during the past thirty or forty years.

The prevalence of the diseases of bees within the past thirty years has also been an important factor in creating the policy of commercial beekeeping, for it is universally recognized that an uninformed beekeeper who neglects his bees is a menace where disease occurs, and too often it happens that a beekeeper with only a few colonies is not adequately interested in his bees properly to inform himself regarding these diseases and to care for them properly. The whole economic and social trend in the United States has also been in conformity with the policy of developing commercial beekeeping, for during these same years we have developed giant industries. With the policy of developing beekeeping so as to provide honey for the markets through extensive producers, I am in complete accord, for the enviable record of American beekeeping, unequalled throughout the world, has been made by such men.

In presenting another phase of our beekeeping for consideration, I am chiefly bringing to your attention some of the things which I saw in Europe this past summer. They are presented merely as suggestions and not as a solution of our problems. Experiences of beekeepers on the other side of the ocean may be worth something to us, provided we do not attempt to follow them blindly but only to utilize their experience in so far as careful study of our own conditions shows them to be helpful.

In Switzerland, France, England and Scotland there is no such development of commercial beekeeping as we have on this side. In one region of France, where conditions are especially favourable, commercial beekeeping is gaining ground rapidly, and to a surprising degree the beekeepers there are following the same methods which have been successful with us in commercial honey production. Elsewhere in these countries conditions seem unfavourable for commercial beekeeping and there are practically no extensive beekeepers such as we have in this and other states, but there are thousands of persons keeping bees and the

organizations of beekeepers in all these countries are in a far more prosperous condition than are ours.

German Switzerland, with an area smaller than the combined area of St. Lawrence, Jefferson, Franklin and Lewis counties of New York State has a beekeepers' organization with about 18,000 members, all of whom receive the excellent journal published as the official organ of the society. French Switzerland has a society which appears to be equally prosperous, although the type of hive used is different and the methods are more like those of this country. In France the beekeepers of each department are thoroughly organized and in almost every department there is either a bee journal published by the society itself or the society arranges for each member to receive a bee journal published elsewhere in the country, but with four pages inserted in each issue which deal with timely items on the local problems of the department and with the affairs of the local society. In England the British Beekeepers' Association has thousands of members and the *British Bee Journal* is issued weekly to the members. The Bee World, published by the Apis Club, is widely read. There are strong county organizations in almost every county and most of them have affiliated smaller units within the county. The Kent and Surrey associations issue their own journal. Scotland has a society in practically every shire and a strong central society, with an excellent journal. Wales and Ireland each support strong journals and the beekeepers are well organized. The beekeepers of Germany and Austria are so much better organized than the beekeepers of the countries named that they are universally envied. There is reported to be a federation of German beekeepers numbering 180,000.

Let us look at the United States by way of contrast as to organization. We practically do not have a national organization, for at the meetings of the American Honey Producers' League there are usually about sixteen to eighteen persons present, and the organization is virtually powerless to assist beekeepers, for lack of support. The policies of the organization are doubtless the cause of this lack of support. Every one of our state organizations is believed by its members to be weaker than it should be. Our county and local organizations are far less active and vigorous than are comparable societies on the other side. Certainly from the standpoint of organization, we in America are not leaders. It has always been thought by American beekeepers that organization is important, and if this is true something should be done to strengthen our organizations, so that they may compare favourably with those abroad. It is possible that societies of beekeepers are not so important as we have usually considered them for we have done rather well in the development of beekeeping without having powerful societies, but if they are not important, this is not usually admitted or believed by those interested in progress along the right line of beekeeping.

It must be admitted from the standpoint of organization, the beekeepers of Europe appear to be far ahead of us. It will not do merely to admit their superiority and to believe that we should follow their plans without first studying carefully the means by which they have organized these societies. After we have done this, then it is for us to decide whether by such means or by some other means we should attempt greatly to increase the influence of our societies. We must not merely emulate without a study of conditions in the different countries.

In each society which is responsible for the publication of a bee journal on the other side, the cost of publication is an important item, and it is, therefore, considered desirable to get as many subscribers as possible, in order that the society can issue the journal at an average cost within the reach of the members.

is that in each of these societies a constant effort is being made to get more educated people interested in beekeeping and engaged in keeping bees. To a large degree the success of an officer of one of these societies is measured by his ability to enlist more educated people in the beekeeping ranks. Several of the societies maintain apiaries which are used solely as places where educated, intelligent people are taught to keep bees. None of our societies on this side would consider such a policy desirable.

There is one fundamental difference between America and the older countries which must be kept constantly in mind in this connection. On the continent there is a peasant class in agriculture, which fortunately we do not have. In advocating the keeping of bees by a larger number of people abroad, there is no effort to interest peasants in beekeeping, for they would not want a bee journal. In England for some years there has been talk in the British Beekeepers' Association of the desirability of getting "cottagers" interested in beekeeping, they being the nearest approach in England to the peasant class on the continent, but while some of the officers of the Association have talked about this, they have done practically nothing which would have that result. Furthermore, diseases, and especially the Isle of Wight disease, have made beekeeping for the British cottager virtually impossible. The conclusion, therefore, is that the efforts of these associations has chiefly been directed to the making of beekeepers among the better educated classes in each community. On visiting twenty-five foreign societies last summer, I was struck by the fact that the members are highly educated, cultured people, drawn from all professions and businesses and almost without exception people to whom an active bee journal would make an appeal. Since it is chiefly the support of the bee journals which has driven the societies to this policy of making more beekeepers, this will doubtless account for the type of recruits which they have all sought.

Complete information is not available regarding the number of people subscribing for bee journals, all issued without loss to the respective societies, it is obvious that the number is enormous. By way of contrast, let us look at the bee journal situation in America. The largest subscription list of any bee journal on the American continent is about 20,000 and probably the total number of persons subscribing for bee journals, including libraries, does not exceed 30,000. Not more than two of our journals in the United States are published without annual loss to the publishers. It is estimated that there are from 800,000 to 1,000,000 persons in the United States owning bees, which means that four per cent. or less of these persons subscribe for a bee journal. Since there are probably five thousand commercial beekeepers in the country, it is clear that the vast majority of those owning a few colonies of bees are not reading the current beekeeping literature. I happen to know that many commercial beekeepers do not now subscribe for a journal. The book which has had the largest sale in the United States has not reachd more than a small per cent. of the owners of bees, and most of the books do not reach one per cent. of the beekeepers. The bulletins on beekeeping issued by the Bureau of Entomology have had an enormous distribution, but they have probably not reached more than twenty per cent. of the beekeepers at an outside estimate. No modern beekeeper would think of doing without a journal and without reading some of the excellent books which have appeared in this country, so evidently we have a vast number who are wholly unversed in modern methods, and this is a fact which every person will recognize who has had opportunity to visit the beekeepers of any limited region, as do the apiary inspectors.

With so many people keeping bees and reading bee journals in foreign countries an enormous amount of honey is produced in each department, county or canton. Not only do they produce much honey in the aggregate, but they themselves consume great quantities, they all talk about honey constantly, and there is absolutely no marketing problem. In Switzerland the chief trouble is that the demand for honey far exceeds the supply, with the result that great quantities of artificial honey are sold throughout the country, there being no law to prevent this such as we have in the United States. There is now a strong effort being made by the societies to have such a law passed, and with the great numbers of beekeepers in their organizations, it seems highly probable that they can bring about such legislation. In France the financial situation at present is so bad that it is difficult to make comparisons with prices or markets on this side, but the marketing of their products is not one of the things about which the beekeepers are especially concerned. In England when I was there, clover and sainfoin comb and extracted honey was selling at retail at an equivalent of 63 or more cents per pound, while heather comb and expressed honey was selling at from 87 cents to $1.25 per pound, with far less of both kinds than the markets would take without trouble. Similar conditions prevail in Scotland.

On this side we rightly complain much about the price-cutter in the honey markets, yet we American beekeepers are constantly accused by our British friends of cutting prices and of spoiling their markets, for American, Canadian and Australian honeys on the British markets sell for considerably less than the prices obtained for British honeys. Naturally British beekeepers insist that British honey is the best in all the world, and they think, or at least say, that American honeys are far inferior to theirs, which simply proves that beekeepers are the same the world over, for we say similar things on this side of honey from sections other than our own. It is not evident that American and Australian competition is seriously harming the British markets, although the British beekeepers claim that it is, and they are doing everything possible to keep our honey away from their markets. We do the same thing over here, for there is a tariff barrier of four cents a pound for honey about the United States, so we have no ground for complaint with the British beekeepers.

It may be asked what the disease situation is in these countries where there are so many people owning only a few colonies each. Briefly it appears not to be as serious as is our own disease problem. The beekeepers talk some of the two serious diseases of the brood, but these diseases are rather well understood by beekeepers generally and they are not causing much loss. The Isle of Wight disease in England and Scotland, for which there is no suitable remedy, is a more serious thing, and this disease now occurs also in France and Switzerland and is likewise reported from Germany, Austria and Russia. In spite of this serious handicap, there is still plenty of beekeeping in Britain and beyond doubt the seriousness of the situation was greatly exaggerated by some of their writers. On this side it is almost universally believed that the beekeepers with a few colonies are a menace where diseases occur, and there can be no question that this is the case in most instances, yet many of our apiary inspectors are ready to admit that the beekeepers owning hundreds of colonies are often centres of infection. At any rate, it is clear that the making of hundreds of small beekeepers from the educated class of citizens has not made the disease situation worse in Europe, which is at any rate worth thinking about.

In summary, these countries where there are more beekeepers from the educated classes and more bees per square mile, where there are powerful associa-

not have strong commercial industry such as we have in parts of the United States, but they do have the other things which most beekeepers have considered desirable in the building of a great industry. Surely there is some connection between the differences in development in these countries with the differences in the policies in the developing of the industry. The question for us to ask ourselves is whether we shall keep our commercial policy in its entirety, with its marketing problem, or shall follow the lead of our European friends and eliminate the marketing problem in the developing of beekeeping in certain parts of the United States along lines comparable to theirs. It is a serious question and there must be no attempt to answer it quickly or with prejudice. We can well afford to think it all over for months before making any change whatever in plans, policies or beliefs.

It may be asked whether there are any places in the United States where organization conditions are at all comparable to those of Europe, for there is always the possibility that social and economic conditions of the different countries are primarily responsible for these differences. Fortunately we do have information on this point. In Massachusetts, for example, there are practically no commercial beekeepers, yet there are hundreds of most enthusiastic beekeepers. Their organizations are influential and are made up chiefly of educated, fine people, most of whom ride bees as a hobby and get much benefit and some profit from them. They do not publish a bee journal and consequently there has never been any organized effort to induce large numbers of people to keep bees, but if it should ever happen that their societies should establish a journal, it is almost inevitable that they would do just as their European co-workers are doing in that respect. In Quebec conditions seem to be quite comparable to those in Europe and the society maintains a good official organ.

Coming now to beekeeping conditions in New York State, we find that commercial beekeeping is practised in a few regions only. Jefferson and St. Lawrence Counties, the Mohawk valley, western New York near the lakes, the limestone area centering about Syracuse and the transition region between limestone and sandstone through the middle of the State are the main regions where commercial beekeeping is possible and where it is practised. It is possible to point out a few other valleys or special localities where a few beekeepers have been able to make a success of the keeping of a large number of colonies, but it is safe to say of the remainder of the State that the commercial beekeeping possibilities are slight.

In those parts of the State where commercial beekeeping is not practised, there are tens of thosuands of colonies owned by thousands of beekeepers. Inquiry made to editors of our bee journals reveals the fact that the number of their subscribers is not materially less in those counties where commercial beekeeping is not practised, but doubtless the percentage of beekeepers taking a bee journal is smaller where there are so many beekeepers.

In those regions of this State where commercial beekeeping appears not to be profitable, it is still possible for a beekeeper with a fewer number of colonies to get a fair average crop, sometimes almost as good as is obtained by commercial beekeepers in better areas, enough to encourage him in beekeeping if he has the instincts of a beekeeper. Whenever a beekeeper in one of these less profitable regions asks for information from a bee journal, from a beekeeper or from one of the institutions where beekeeping is taught, he gets it, of course, yet nothing has been done in an effort to develop beekeeping in these counties in such a way as to lead to a safer condition of beekeeping in the State as a whole or to bring a better class of beekeepers into the work.

In the less profitable areas from the commercial point of view, there is no marketing problem even now. We do not hear of difficulties on the part of the beekeeper with ten to fifty colonies in disposing of his crop, if he is a real beekeeper. The enthusiastic amateur beekeeper talks bees incessantly and sings the praises of honey without ceasing. When his crop is off, it is sold without the slightest difficulty because all of his friends have heard so much about honey that they feel that they must have some. It frequently happens that the small enthusiastic beekeeper is compelled to buy honey from his commercial associates to supply his trade.

There is another class of beekeepers less desirable from the marketing point of view, and from every other point of view, the beekeeper who gives no care whatever to his bees but who takes a few pounds of honey from them at the close of the season if it is not too poor. Never giving any care to his bees, he never talks honey to his friends, but when he does get a few pounds of honey he takes it to the local store and sells it for any price offered. Such a beekeeper is a direct detriment to all those keeping bees, whether on a large or a small scale. Through ignorance he usually undersells the market, loses money himself and causes loss to those legitimately engaged in beekeeping.

Of these two classes of beekeepers owning only a few colonies, all will agree that the first class is often helpfnl to the beekeeping industry; the latter class a great detrimeut. But in the development of beekeeping we have given no effort to the introduction of a desirable class of small holders and have usually and quite unfairly lumped all those owning a few colonies into a class of undesirables in beekeeping. Comparing our conditions with those abroad, we find that in Europe they have encouraged the better educated class of small owners in every way. Lacking the more favoured localities, such as some that we have in New York State, some of the European countries are composed exclusively of regions comparable to the less desirable of this state from a beekeeping point of view.

For years past we have done nothing in the United States to encourage a better group of small holders in beekeeping. Let us recall that the marketing problem arises solely from the commercial development of beekeeping and that the proper sort of small holder sells all his own honey at a good price and often assists the commercial beekeeper to sell some of his crop. The question now arises whether we might not materially help the development of commercial beekeeping in regions adapted to that sort of beekeeping by encouraging a better class of small holders in less favoured regions.

Beekeepers frequently feel the need of numbers in obtaining appropriations, in combating evil legislation, such as the corn sugar bill now before the Congress, in the passage of proper legislation for the control of bee diseases and in various other ways. The number of commercial beekeepers in most states is small, too small to command the respect of the legislatures, which beekeeping deserves. There are now thousands of small beekeepers who can not be enlisted in such a cause because we have no means of reaching them to ask for their help. With an enthusiastic lot of small beekeepers who read the bee journals and who are alert to everything that happens in beekeeping circles, it would be possible to get from them much needed help in such lines of activity.

If it should be considered desirable somewhat to modify our policy with regard to the making of a better class of small beekeepers, there is some machinery available for that purpose, although certain other steps would be necessary in order properly to care for such beekeepers. If those engaged in extension work in the various states understood that the commercial beekeepers of the country looked with favour on the teaching of better beekeeping methods to the more

educated portion of those engaged in beekeeping in a small way and in those regions where commercial beekeeping has been found unprofitable, it would be comparatively simple for them to assist in this work, whereas now they all feel that the commercial beekeepers would object and they want to do nothing which will not meet with the favour of the commercial beekeepers, the backbone of American beekeeping.

Let us suppose that in a few of the counties of New York State where commercial beekeeping is impossible, the extension specialist were to appear before ministerial associations, teachers' meetings and perhaps societies of physicians and lawyers. Bees interest any one when properly presented, and if it were considered desirable the specialist could, without doubt, induce people in such groups to engage in beekeeping. Suppose also that these new beekeepers were encouraged to go about the country to buy up bees now in the hands of careless people who never give their bees the slightest care. Suppose further that all these enthusiasts talked honey constantly, as we know that they would, and that they were encouraged in every way to develop local honey markets, there would certainly be no marketing problem in communities so handled. Suppose further that these beekeepers were encouraged not only to sell their own small crops at a decent price but that they were told where there are commercial beekeepers who would be willing to sell them a good grade of honey at a price sufficiently reasonable to permit the retailer to make a small profit for his share of the work of carrying it to the consumer. Such a plan would not, at least for some time, be capable of disposing of the entire commercial crop of New York State, but it would help materially within a few years in relieving the congestion in the wholesale marketing of New York honey.

It is doubtless agreed that if these things were done, every county so covered would not only consume all of its own honey but would bring in from the commercial areas of the State considerable quantities of honey which now clog the market. The encouragement of a shiftless, ignorant group of people in beekeeping would be a crime against the advancement of beekeeping in New York or any other state, but it is within the range of possibilities that the encouragement of intelligent small holders would help us materially to solve the worst problem which has ever confronted the American beekeeper. At any rate it is worth thinking about for a time, and certainly it will be necessary for all persons interested in the proper development of beekeeping to think seriously before any change whatever is made in present policies.

When we consider the fact that the vast majority of even the better small beekeepers and a considerable number of the extensive commercial beekeepers of New York State do not now read a bee journal, it would seem desirable for the state society to consider carefully the possibility of publishing such a journal. Several state societies have tried this with some success, but in every case so far an effort has been made not to conflict in any way with the established bee journals, largely no doubt because they are such excellent journals. As a result of this policy, the official organs now published in the United States do not carry to the subscribers the sort of information which they need in improving themselves as producers or marketers of honey. If the society of New York State should decide at any time to publish an official organ, the best policy would doubtless be to enter the bee journal field directly and strongly, thus giving a much needed competition to the existing journals.

There are serious problems to be considered in establishing such a journal, the chief of which is a means of financing the paper for the first year or two, until such time as it would be self-supporting. Another most serious problem

would be to find the right man as editor. If the society decided to follow a policy which will lead to an improvement in the personnel of beekeeping, then it will be quite necessary for it to assume some financial responsibility, for there is no way to finance such a movement unless the society itself does this. I believe that it will be possible to find some one with journalistic experience who would be willing to edit the paper for a time even without much or any compensation, for the sake of helping to develop beekeeping along safer lines than those of the past.

The extension service cannot make all the changes in the development of beekeeping which appear to be necessary, and it can only help in this movement. No change in policy of the extension work will be made until the beekeepers agree almost unanimously that such a change is necessary, and nothing will be done which will overthrow the work already accomplished through the efforts of beekeepers and those who have worked for the advancement of beekeeping in this State. The only way which seems available to bring about the changes suggested by what has been said seems to be to establish an official organ.

Although I am unwilling at this time to make any definite suggestions regarding a change in the policy in New York State, there is one suggestion which may safely be made at this time. I suggest that we obtain the names and addresses of every beekeeper, large or small, in a few counties of the State, which would be possible through the co-operation of the Department of Farms and Markets for certain counties where the most methodical inspection has been carried on within the past few years. Then let us determine as accurately as possible where these people live, whether in towns or country, what their occupations, if any, are aside from beekeeping, how successful they are with their beekeeping and with the marketing of their products, whether they subscribe for a bee journal or read other current beekeeping literature, and in fact learn all we can regarding their fitness for beekeeping. Finally, we can enlist the aid of county agricultural agents or others within the county to determine the individual influence of these various beekeepers within the county. From this information, let us determine which beekeepers are an aid to beekeeping and which are a detriment. Some mistakes would perhaps be made in such a survey, because of the personal element which must enter into it, but on the whole I feel sure that we could make a good estimation as to what class of people make beekeepers which are helpful to beekeeping and what classes are usually a detriment to the industry. Naturally all of this work would be done without giving out any names. From such data we ought to be in better shape to form an estimate as to what sort of work can be done with profit to eliminate the worst element among the negligent beekeepers and how we may best aid beekeeping development by enlisting the proper kind of people in the work. Let us remember that there will be small holders of bees whether we like it or not, so that it is not a question of eliminating all small beekeepers but rather of making beekeeping attractive to the right sort of small holders.

The suggestion, and it is nothing more, that perhaps the development of local markets through intelligent amateur beekeepers would be the proper solution for the marketing problem is presented with much hesitation. It is certainly not advocated as a complete solution of our problem. It is given merely to start us thinking about the path which we have all followed and to point out that we have to a considerable extent brought the marketing problem on ourselves. There is no panacea for the marketing problem in the way of co-operation, wholesale marketing, national advertising or any of the other plans which have been from time to time proposed and urged on the beekeepers of this country. Some

an economic or practical point of view. Others are so completely untried that we cannot put our faith in them, and are so improbable as to make it scarcely worth while for us to try them. We must above all things avoid leadership in these matters which comes from those having a motive other than the promotion of the prosperity of the beekeeper. I doubt if there will be any solution of the marketing problem based solely on some plan of selling honey, for it will be necessary to dig deeper than that, to determine the causes of our present troubles, which cannot be removed merely by artificial and temporary stimulation of a limited market. We must study beekeeping from every point of view and delve into every phase of the subject before we dare say that we have found a way out of the present muddle.

Let me say in conclusion what I said at the beginning, I am not advocating anything whatever regarding a change in our policy with regard to the advancement of beekeeping. I have merely tried to bring up for consideration something which arose from my summer's trip, in an effort to bring light into the hitherto absolutely dark region of honey marketing. Certainly the seriousness of the marketing problem and the absolute lack of a suitable solution of it up to date may well permit us to think without bias along any line suggested in an effort to bring about better conditions to the beekeeper, now suffering under a load of inadequate facilities for disposing of his product. Unless we are able to find a fundamentally sound solution of this great problem, commercial beekeeping in the United States must collapse.

MODERN BEEKEEPING

Geo. S. Demuth

It is worth while to take a brief retrospective view of the road over which we have come, in order to the better judge where we are and whither we are going in honey production. I have before outlined to this Association a portion of the things I have in mind, but I am going over very briefly some of the things and shall represent a phase of the subject which is new at least to me.

Going back in the history of the development of beekeeping in North America, we find in the early days the box hives and skips, what we may call the ancient beekeeping. We laugh at the box hive beekeeping and the box hive beekeeper, and yet there was a book, a classic, written in the United States on the subject of keeping bees in box hives, and we to-day refer to that book because it is a classic; and many of the new things we discover, when we take time to look back, he wrote about away back in the days of the box hive, and Quinby's "Mysteries of Beekeeping" explain them. At the same time that Quinby's book appeared, Langstroth's book appeared. These two great pioneers, neither knew anything about what the other was doing until after their books came out and they found that the other man also was working in the same field.

Langstroth described beekeeping with the modern hive. Quinby described beekeeping with the box hive. Langstroth's book brought in a new era and introduced modern beekeeping.

During the first few years of modern beekeeping, honey was produced in boxes; there was no foundation, no sections, no excluders; many of the things which we know now were not then in existence. The box holds several combs, and the box, honey and all, was weighed up and sold. Some even went so far as to get out a fancy box, having the sides made of glass to show the honey on the market.

One great step forward in beekeeping was the invention of Langstroth's modern hive. A few years later appeared another great invention, namely, that of the honey extractor, which caused great changes in the practice of beekeeping. During that short period of extracted honey production there were a number of changes in hive construction, which I am not going into, but it was thought that they had solved the problem of building a standard hive for all future time, that they had solved the problem of swarming. They built a wide or a long broodchamber and had the super and the broodchamber in one box; and all they had to do was to lift up the lid and take the combs out of the hive and extract them and put them back. The practice at that time was to extract all the honey from the brood combs and the super combs, if you may call them that in this box.

At that time A. I. Root made a startling announcement that he had secured a barrel of honey from a single colony in one season. Now a word as to the way in which they got their big yields. They extracted all the honey from all the combs every week. If you want to get a big crop next year, if it is a good year, take out all the honey from all the frames throughout the hive, and you will get an enormous crop of honey; but I do not know what you will do with it when you have got it. A story was told of somebody who put up a barrel of this honey, selling it to somebody in New York city. The merchant was in his place of business and the barrel was opened in his presence, and he got all smeared up with the gases and the thin honey which spurted out of that barrel.

After a few more years another great invention came on the horizon, in the form of foundation. In Europe they had been using sheets of wax made by dipping a wet board into melted beeswax and pulling off the sheet and putting it on the top bars of frames as starters. They actually started embossing this sheet in some way to make it more acceptable to the bees; but later in the United States a roll machine was built by A. I. Root, at Medina, and the magnificent amount of 100 pounds of comb foundation was sent out from the great factory at Medina in one year! This was sent out to beekeepers all over the country, and introduced a new thought to them, that of producing honey in the comb, since they had so much trouble in selling their extracted honey.

When the extractor came out, it was pointed out that it would enable beekeepers to eliminate swarming, and they could extract so rapidly that it would enable them to get a larger crop, because it would save the construction of the comb by the bees. They thought that by the use of the artificial comb they would be able to produce honey in the comb and sell comb and all nearly as cheaply as they had been able to sell their extracted honey out of the comb.

We know now that bees do not look upon comb foundation in quite the same way as they look upon their own comb. They look upon it about the same as a board until they have worked upon it; after that they recognize it as comb. This introduced the era of comb honey production, which was, to my mind, one of the most interesting eras that we have passed through; an era which brought onto the stage some of our greatest men in beekeeping; and some of the best thought of these men was put into the problem, because comb honey production introduced most intricate problems. It brought back to them the swarming problem, and many other problems which had been eliminated by extracted honey production. These problems made great men. The difficulties of our problems of to-day are going to make greater and greater men in the industry; and some day the beekeepers now up against extremely difficult problems are going to solve some of them. I may have more to say about that later if there is time.

During this comb honey period the literature is full of most excellent articles. When I want to get inspiration I sometimes go back and read over the articles written by some of those great men in the comb honey era. When we see the brilliancy of that period, we wonder if we are going in the right direction now.

The comb honey era lasted longer than any of the others. First, we had the box-hive era, which was the ancient beekeeping. Then we started out in modern beekeeping with the box honey era, when honey was sold in the multiple comb boxes, not sections. Then we had the first extracted honey period, when thin extracted honey was produced and an attempt was made to market it, ushered in by the extractor. Then the comb honey era, ushered in by the comb foundation, which lasted a long time and contributed greatly to the development of the beekeeping industry. But the comb honey era, with its difficult problems, brought with it other things. Every beekeeper producing comb honey knows that the first requisite is to have the broodchamber practically full of brood all through the season, so that there is no room for honey storage in the broodchamber; so that when the supers are put on there is no place to put the honey but in the supers.

In those days they had their difficulties in wintering too; and they had their difficulties with spring management. They had difficulty in getting their colonies up so as to have the broodchamber full of brood at the beginning of the clover honey flow—it was white clover to a very large extent in those days. They had the standard ten-frame hive, and finding that often there were two or three frames shy of being full of brood, they began by taking out those combs which were not full of brood and sticking down what they called a dummy, a division board, to fill it up. That soon brought them to an apiary of ten-frame hives the year around. They said, what is the use of having a big hive and then making it smaller by putting something inside to shut it down? Why not cut off those two frames? And that was done, and we had the day of the eight-frame hive for comb honey production. A few years later there came into our literature the contraction system. Even an eight-frame hive they found many times had two or three combs not filled with brood at the beginning of the honey flow; and to get comb honey from those hives they took out the combs not filled with brood and cut the hive down to five or six combs; and they could get something of a crop with such colonies.

The contraction system was so much talked about and so much heralded before the beekeepers of this country that it became quite a fad, so that every convention had for one of its great topics the contraction system. I remember very distinctly an article written by that brilliant writer, James Heddon, a Michigan beekeeper of that period, which appeared in the *American Bee Journal*, in which he described what he called the contraction system, but he says it is really the expansion system. He says: "My colonies live on five combs, and they were what they call the standard Langstroth size, throughout the year until the period of brood rearing in the spring, when I put in three more combs and give them eight. Then at the beginning of the honey flow, he says, I cut it down. It is usually cut down by swarming, and he would hive them on five frames, or if it were not completely full of brood the combs were taken out and the dummy put in, and the colony was taken through the season on five combs. So that during the season five combs were considered the proper size for the hive,

Mr. Heddon, reasoning along this line a little further, said to himself, here are five combs in the middle of this hive, with a dummy on this side and a dummy on that side, and sections on each side; and he reasoned that it would be better to have a shallow comb for brood under all the sections instead of merely under

those in the middle; so he brought out his divisible broodchamber hive at a convention in Michigan. Mr. Heddon was on the programme for the subject of "Contraction," and he sprung this invention of his, the divisible broodchamber hive. He figured out what the depth of the broodchamber should be to give it the capacity of five standard combs; and he found that the combs should be 5⅜ inches deep; and that is where we get our shallow extracting super to-day, having the same capacity as five combs. Now, he says, here we have a hive adapted to the contraction system. We will have the broodchamber in two sections during the building-up part of the year and in one section the rest of the year; and he described how nice it would be to be able to carry these little ones into the cellar in the fall.

I feel that I had better read a few paragraphs to tell you the results of this movement in beekeeping, which was followed not only in the United States but also in Canada. In fact, you in Canada led.

Mr. Hutchinson, of Michigan, was so full of the subject of comb honey production by this system that he started a bee journal of his own in order to tell more fully the great message to all the beekeepers of the country. He was a great missionary. In the *Beekeepers' Review*, which he established; and if you want some real literature in beekeeping get hold of the back numbers of that journal, because I fear that American and Canadian beekeepers are not saving the old journals as they should, for reference, because there are great mines of wealth buried in the back volumes of all the bee journals.

In starting that journal in 1888, Mr. Hutchinson conceived the idea of having each issue discuss a special topic. I remember distinctly, in the winter of 1887-88, when the first issue of the *Beekeepers' Review* came to me, as a boy, it discussed the important subject of disturbing bees in cellars. The next number discussed some other subject. Each issue was complete in that it discussed a single topic. He kept that up for some years. Mr. Hutchinson in each issue would write what he called his leader or editorial, which was simply telling the beekeeping public what he proposed to discuss in the next issue. He would discuss in this issue the subject that was to be discussed by others in the next issue. He would start them off by saying something which would get the others to write. In 1891, Mr. Hutchinson, in one of his leaders, said: "In the next issue we are going to discuss what shall we do if poor seasons continue?" And he wrote this: "In 1888 the average yield in my apiary was 10 pounds per colony. In 1889 it was 20 pounds; in 1890, not one pound; in 1891, 5 pounds. And we think we are hard hit now. The honey stored in my apiary the past four years would not have kept us in food more than one year. I am forced to believe that hundreds of beekeepers could make a similar report."

Then he went on to discuss some changes in the flora of Michigan. Agriculture had come in and made some changes; but, he says: "What puzzles me is that we had good crops for ten years and then poor crops for four years. It seems as though the change ought to have been more gradual—that is, if it was a result of the change in flora."

Then in the next issue, December, 1891, there were a number of articles from men who were discussing a topic that they did not know much about, just as we have many discussing the marketing problem which we do not know much about; and when it came out there was great disappointment.

One of the brilliant writers of that time said this: "The only thing which is going to save the beekeeping industry is to produce and sell sugar honey."

You older beekeepers will remember when Hasty stirred up a regular hornets' nest by suggesting that they would feed sugar syrup and produce comb honey.

He stirred up a hornets' nest, and Mr. Hutchinson got into quite a bit of trouble over it. That was Mr. Hasty's solution. Others offered different solutions; and I find only one paragraph in the whole number that touches on the real trouble and suggests a possible remedy. That was written by R. T. Taylor. Dr. Phillips says lawyers might not make good beekeepers, but here was a lawyer writing. After some rather chaffy remarks about having the weather man change things—at that time they were talking about bringing on rainfall at will —he said the rain-man would probably have to invent some new condition for the weather; and in the last paragraph he said something which I want to read: "I will close with the suggestion of one other possible remedy. In my home apiary the past season I had one swarm for about every 25 colonies; but there was one colony which cast a swarm and gave a surplus of 75 pounds over and above the stores for two colonies."

A little later, in 1892, he wrote this significant thing: "The very colony which cast a swarm as soon as the first opening of white clover, has given me more than an average amount of surplus comb honey, and by that I mean more than an average of good seasons. And from that it has become a dream of mine that all colonies having reasonably good queens could be brought to the strong point by that time."

That was the comb honey era, and those were the results of contraction; and the beekeeping industry was put down into the dumps a whole lot further than we are at the present time. He who says that beekeeping is ready for the bow-wows at the present time has not gone back over the literature of the past; looking to see where those men climbed out, and considering ourselves, we have reason for hope.

The comb honey era passed. In the United States it terminated not suddenly but gradually by a law by which the purity of the beekeeper's product was guaranteed by label, instead of by sending it to market in the comb in which it was built. That was the beginning of commercial honey production in the United States, because it brought in a large scale production of extracted honey. From that time we have been going on at a most rapid pace of development, in both Canada and the United States, for the North American continent's beekeepers' progress cannot be separated, because we are a unit. We have come into a second era of extracted honey production, which has gone through some phases which are extremely satisfactory and significant in many ways.

The effects of the Great War were to stimulate extracted honey production extremely; and the after effects, as you of course know, were to bring down the price of honey to a level which, when considered in the light of the purchasing power of the dollar, is lower than it was before.

We are now in a new phase of this new era, that of volume production in step with the development of all industries on the North American continent. And in this new era, as Dr. Phillips pointed out a while ago, honey production has become more or less of a gamble than it formerly was, shall I say? In other words we can produce some honey, even in a poor season, because we know what was the matter back there when they had very short crops. So far as honey is concerned, we are not so much worried about being able to produce a crop as we are about being able to sell it. This introduces a new era which is so different from the beekeeping of the past that it stands out as something new; and those of you who can go back through the literature, or who are old enough to remember, will recall the great changes in honey production. We now count on having a great percentage of the colonies equal to the strongest and best each season; on having greater uniformity in the colonies at the beginning of the

honey flow. Instead of the one colony, of which Mr. Taylor spoke, securing a crop in that season, we now count on 90 to 98 per cent. of our colonies producing a crop. So that we have increased our average yield by securing a better average. Our 1927 crop was started for in last July and August; and it is already determined, so far as the condition of the colonies and the condition of the clover is concerned, what our 1927 crop shall be. If we could turn back time, we could greatly increase the 1927 honey crop in Ontario; but we cannot do that now; it is too late.

This new beekeeping does not take chances like the old beekeeping did. What would happen to a business man if he took chances like the average agriculturist does? What would happen to the merchant or the manufacturer if he took chances, even the chances which beekeepers take at the present time? We are in an era of business beekeeping. It is a business man's job; and we are in a period when, if we move on, we are going to be compelled to open up outlets for honey and move it on to the market better than we have been doing in the past.

Dr. Phillips, in his talk this morning, spoke of something which is really significant. All the A. I. Root Company started to do and is doing were the very things which Dr. Phillips has been talking about this morning. To illustrate what I mean, the A. I. Root Company, as a channel for the distribution of their beekeeping supplies, has a system of jobbers and dealers throughout the entire United States, and some in Canada. They are not in a position to dictate what these dealers shall do, but all the pressure possible is being brought to bear upon the dealers in beekeepers' supplies to take his share of the burden of the honey supply, and it is working. If only a few more of them would take hold of it and become real honey merchants and help in the distribution of the crop, we should not have so much trouble as we are having now. And am I not right in thinking that your co-operative insists that your local market be saturated before any of your supply goes on the wholesale market? Your wholesale markets are only to take care of your surplus which cannot be used in the local markets.

I am not a prophet, and I would hesitate to prophesy, but I am going to take a chance. If I did not believe in the future of beekeeping, I would not sit at a desk day after day down at Medina, with the great out-of-doors calling me all the time. I would not stay there ten minutes if I had not faith in this industry. I would get out and increase the number of my apiaries and have a good time for the rest of my life. I would sell honey to my neighbours and have lots of fun anyway.

My prophecy is this, that within the next few years—I am not going to set a date—honey is going to be better known and more consumed than ever. I do not know what date to say, but within twenty-five years, to be safe, this marketing problem is going to be solved in some way. Various plans will be put into operation, as they are being put into operation at the present time, and in the future commercial beekeeping is not going to die. These men who have developed the great commercial industry are going to push ahead, and their troubles will be an incentive to getting ahead.

Supposing I am a producer with 800 colonies, and have no other source of income. If you come to me and say, cut down the number of your colonies to 400, in order to keep up the price. Will that increase my income? Are you guaranteeing to double the price of my product? When you talk to a man who is producing honey and advise him to cut down his output in order to increase his price, that is something he cannot do. If you can tell him something else to do, that is another thing. But to tell a man whose one source of income is from

his honey production, to cut down that production in order to increase his income, I cannot see it at all.

If you tell a farmer who is producing several things to cut down on his corn, that may be all right. But what else can a beekeeper do, unless he goes south into the production of package bees? In the future, not only will we find a market for more honey than ever, but we will also do that thing which we are going to talk about this afternoon, shave down on the other end, and increase our production. I do not know whether honey will be more than ten cents a pound, but honey producers will make more money.

REPORT OF COMMITTEE ON RESOLUTIONS

We, your Standing Committee on Resolutions, beg leave to submit our second report.

1. Having been informed of the death of Robert Lowey, who was at one time a member and a prominent official of this association;

Resolved, therefore, that Secretary Millen draft a letter of sympathy and send it to the home of our late co-worker at Woodrous, Ontario.

2. Resolved, that the appreciation of the members of this association be tendered to Mr. John Brunne for contributions of honey beverage for the banquet table on the evening of December 7th.

3. Resolved that the very best thanks of this association be tendered to the management of the Prince George Hotel for kind courtesies received during convention week.

4. Resolved, that grateful acknowledgment be made to the visitors from the United States for their presence in our midst, including especially Miss Mary Barber, representing the W. K. Kellogg Company, of Battle Creek, Michigan; George S. Demuth, of Medina, Ohio, and Dr. E. F. Phillips, of Cornell University, Ithaca, N.Y., to them and each of them, for valued contributions to the programme of this convention. The memory of their presence and assistance will remain with us as "apples of gold in pictures of silver."

All of which is respectfully submitted.

(Signed) M. B. Holmes,
J. A. McKinnon,
George Neil.

Report of Resolution Committee was adopted.

HOW A STUDY OF THE OCCUPANTS OF THE HIVE MAY INCREASE HONEY YIELDS

C. B. Goodерham

In this age of competition any business engaged in production, whether it be factory or farm, must be so managed that it will produce its particular commodity to its fullest capacity with a minimum cost of production consistent with quality. To be able to do this, the business must have at its head a person who has studied that particular line of work from every angle and who thoroughly understands it.

Beekeeping is a business of production and I do not believe there is any other industry that will yield greater returns for skill and good judgment, but I am doubtful as to whether there is any other industry as a whole that shows as much lack of these two essentials as does beekeeping, for there are a great many apiaries throughout Canada that are not producing the crops they are capable of producing with better management. It is true that honey crops are sometimes light from causes that are beyond the beekeeper's control but more often are they light because of mismanagement due to a lack of knowledge of bee activity or through neglect.

To get the maximum returns from an apiary it is essential for the beekeeper to have a thorough knowledge of bee behaviour or activities under any condition, normal or abnormal, for any manipulation of bees must be based on such a knowledge, yet how many are there keeping bees without any, or only a meagre knowledge of their activities or requirements. For instance, there are some people who think that beekeeping is a get-rich-quick proposition requiring little or no knowledge of the business to make it successful. Present day methods of beekeeping all developed from studies of bees themselves, and those beekeepers who have made the greatest advancement in beekeeping and who have added the most to our store of knowledge are those who have learned the most about bee behaviour. Many of you beekeepers can recall the time when bees were mostly kept in box hives and when fifty pounds of honey was considered a good crop for a colony. To-day bees are mostly kept in movable frame hives and good beekeepers are producing crops ranging anywhere from one to two hundred pounds per colony, while there are records of colonies storing over six hundred pounds. Modern equipment and a good location alone, however, do not produce these larger crops. There must be a thorough acquaintance with the bees, their behaviour and requirements and a system of management based on this knowledge.

In a normal colony there are three kinds of bees, namely, the queen, workers and drones, and each kind has its own particular function to perform for the well-being of the colony. The queen is the mother of the colony and her function is to reproduce the race. The workers, as their name indicates, are developed for a life of labour. They are responsible for the routine work of the colony; the care of the brood, housekeeping, wax building, gathering supplies, defence, etc. Although they are females incapable of reproducing the race, they will, under certain conditions, produce eggs that will develop into drones. The drones are the males and their sole function is to fecundate the young queens and thus insure the continuity of the race. How may these occupants of the hive be made to increase production? Simply by studying their habits and their response to any given condition and devising a system of management in accordance with these habits. Much has been learned but that does not necessarily mean that the limit has been reached. The very fact of extreme variation in colonies in similar locations and under the same management indicates that there is something yet to be learned.

The Queen: The queen is the mother of every other bee within the hive and as such she is responsible not only for the strength of the colony but is largely responsible for the characteristics of her offspring in that she transmits to them her own characteristics. The ability to gather nectar, the response to swarming instinct, the resistance to disease, etc., may be transmitted through the queen. A good queen can build the colony up into a good one that will be a producer but a poor queen can never do so.

We all know that there is a great variation in the yields of different colonies even when in the same location, under the same system of management and when headed with queens of equal ages. There are some apiaries in which the yield per colony varies from 50 to over 400 pounds, even though the colonies apparently had an equal start in the spring. What are the causes for this variation? Location, management, or equipment do not appear to be altogether responsible; therefore, it must be in the bees themselves, and a study of them must be made in order to explain and correct these differences. It is believed that the main cause for variation in colony production rests largely with the queen of the colony and we are firmly convinced that if the beekeeper himself will devote a little more time to the selection and rearing of his own queens that he will be well repaid in increased crops.

There is a lot of talking done about certain characteristics that are desirable in queen bees, but after all, how much is known about them or how many beekeepers study them with a view to improving their stock? Only a few weeks ago a certain bee journal carried an article which stated that all colonies should be headed with 5,000-egg-a-day queens. In the light of recent experiments regarding the prolificness of queen bees, such a statement would indicate that the writer of the article based his statement on opinion rather than facts. In the *American Bee Journal* for July, 1924, Dr. Merrill published some results obtained from a series of brood counts made by him for two or three years in succession and he shows that the highest daily average for any queen in his experiments was 2,030 eggs for a period of nine days. Mr. Nolan of Washington has also been working on this problem and some of his results are published in *Gleanings in Bee Culture* for July, 1924, and also in Bulletin No. 1349, U.S. Department of Agriculture. Mr. Nolan's highest daily average from counts made of sealed brood only, was 1808. At Ottawa similar work has been done and in 1924 the highest daily average for a 21-day period was 2,049 eggs; and in 1925, for a similar period, the highest was 2,234. The figures obtained by Dr. Merrill, Mr. Nolan and at Ottawa fall far short of the generally accepted 3,000 a day, let alone 5,000; and I believe the queens used in these experiments were equal to any that can be found, at least their colonies produce crops that will compare favourably with those of any other country. The average beekeeper, of course, is unable to make careful brood counts; but taking 2,000 eggs a day as an average during the highest period of brood production and considering the size of a Langstroth frame and the usual shape of the brood area, there should be the equivalent to 8 combs well filled with brood. This would give a colony strength of approximately 84,000 bees, if the life of the bee is taken as six weeks.

In addition to prolificness, there are other characteristics to study. These are size, vigor, tendency to swarming, etc. Mr. Jay Smith, the well-known queen breeder, lays great stress on size, and other investigators claim that size is linked up with length of tongue and carrying capacity. Some beekeepers claim that their most prolific queens were ones that would pass through a queen excluder quite readily, but the final criterion of a colony is the crop it produces. The question is: Is a colony headed with a small prolific queen able to store as much honey as one headed with a large prolific queen? It is believed that size is also linked up with prolificness and vigour as well as storing ability.

The question of swarming is another problem that requires study. Beekeepers have tried to overcome it by enlarging the brood chamber or by manipulation and have succeeded in reducing swarming to a very low percentage but the instinct to swarm is still there and is transmitted from one generation to another, and given favourable conditions will exert itself in spite of large hives

If more study is given to the question of breeding and selection, there is every reason to believe that the instinct for swarming can be reduced to a negligible quantity. We know that breeders of other live stock have been able to not only eliminate undesirable characters but have also increased the powers of production. It is said that this cannot be done in bee work except in isolated apiaries because the beekeeper has no control over the mating of queens. This is true to a certain extent, but it is also true that few beekeepers take advantage of the control that is possible. This, however, will be dealt with a little later.

Too many beekeepers depend on others for their queens or allow their own bees to requeen themselves promiscuously. In the first method there are many disappointments; the queens may not arrive when wanted, or they may be dead, injured, non-prolific, not purely bred, mismated and very often are superseded very soon after introduction and even if accepted and safely established are seldom an improvement over those that they replaced. The second method usually tends to deterioration of the stock kept. The variation in colony production has already been referred to in this paper and this variation should be taken advantage of in improving the strain of bees kept. In almost every yard there is one or more colonies that will excel all the others in storing ability and usually it is these outstanding colonies that show the least tendency for swarming and are the easiest to handle, both of which are desirable characteristics. Should the queens of these colonies be pure Italians and of good size, the beekeeper is well advised to rear other queens from them, and finally have every colony headed with queens of this particular strain. By constantly breeding from the best and selecting from the offspring, there is every possibility of bringing all colonies up to a high producing standard. I do not have the time to discuss methods of queen breeding here, other than to say that there is no mystery about it. Study the bees, ascertain the conditions under which they will produce queens, consult a good book on queen breeding, and any one can rear queens.

We have spoken of the desirability of using only the best stock possible for the production of queens, but the queen is not the only direct influence on the behaviour of the colony; there is another factor that is just as important as she is and that is the drone which mates with her. Breeders of other live stock lay great stress on the importance of the males in the improvement of the breed. It is true that practically nothing is known of the transmission of characters in bees especially on the male side, but there is no reason to doubt that the drone is just as prepotent as the queen, and until it is proved otherwise, just as much care should be exercised in the selection of the queens that are to produce the drones as of those that are used to produce the queens. In the selection of queen or drone mothers we should study the records of at least two or three generations back. This is especially true of the drones. The drones of a good colony of bees may not be desirable, as some of the characters that make the colony a good one may have been derived from the drone which mated with the queen of the colony and transmitted to the workers, but the drones produced by that queen do not derive any character from their mother's mate; in other words, the drone has no father, but he has a grandfather, therefore, we must go back at least one generation before we can get any data on the desirability of a drone for breeding work. It has been said that controlled mating is impossible in the average apiary. That is true, but the percentage of mismating can be considerably reduced by restricting drone production in all colonies except those containing the queens from which it is desirable to breed and encouraging it in these by giving one or more combs built on drone foundation so as to have a preponder-

ance of drones from desirable stock flying in the yard. Even after every colony in the yard is headed with desirable queens, one needs to watch for throw-backs. I have dwelt at considerable length on breeding work because outside of methods used comparatively little study has been given to this phase of beekeeping and because it is from a study of this that I believe the greatest improvement will come.

THE WORKERS: These are responsible for the gathering of the crop, and it is also through a study of these and their activities that any advancement can be made. Stress has been laid on the importance of studying the queen and drones in breeding work and although we rear these from desirable strains we must also know whether the queens we rear are transmitting those characteristics that will make the workers more profitable as honey gatherers. For instance, they must be large for vigour and carrying capacity, they must not show a ready desire for swarming and they should respond to simple methods of manipulation for swarm prevention, they should also be gentle to handle and resistant to European foul brood. It is not going to increase colony production to propagate a strain of bees that waste their energy in swarming or that will stay at home when nectar is available in the fields.

The beekeeper must study the behaviour of his bees in relation to all their activities, brood rearing, nectar gathering, swarming, wintering, etc., and from this study he will be able to develop a system of management that will make them more profitable.

The queen is responsible for the production of brood but it is the workers that are responsible for the development of the brood to maturity. They must feed and incubate it. The queen may lay the eggs but unless there are enough bees to keep up the proper temperature or food enough to nourish the young larvae the colony will never build up. In the spring of the year when the heaviest production of brood is necessary what happens in a weak colony headed with a prolific queen but not well protected? The queen will often expand her brood nest beyond the ability of the bees to keep it warm and much of it will perish from chilling or the queen may waste her energy in depositing several eggs in each cell. Or, take a colony that is short of stores, brood rearing slows down and finally stops which is sometime before the starvation point is reached. Yet there are many beekeepers who do not realize these facts, or if they do, ignore them and then wonder why they cannot produce honey crops, it is because they d o not study the activities of the bees under these particular conditions. if they did, they would know how to rectify them.

Bee activity in relation to nectar gathering also requires a great deal of study but many persons keeping bees pay little or no attention to it. To gather a crop of honey there must be as large a force of workers as possible and when nectar is available conditions at home and abroad must be suitable for them to work to full capacity. Conditions in the hive must be right in regard to ventilation, distribution of bees and room for brood rearing and storage of nectar. If these are not right there will be loafing and swarming which result in curtailment of crop. Conditions abroad, such as weather and abundance of nectar, are beyond the beekeeper's control, but still he should know something about them and know just what amount of nectar is coming in so that he may use judgment in supering the colonies. One or more colonies on scales will give fairly accurate data of what the bees are doing and will guide him in supering his bees. How much honey is lost or swarming brought on simply because the beekeeper fails to supply his bees with enough super room at the right time! It is loss in dollars and cents to allow the bees to fill the supers before others are given. On the

other hand, much honey is spoiled and loss occurs when too much super room is given.

Natural swarming is a source of worry to most beekeepers. It usually occurs at the commencement of and during the greatest honey flow and unless prevented will reduce the honey crip. To prevent swarming it is necessary to know the factors that influence this particular activity of the bees. Mr. G. Demuth has stated that the cause of swarming is congestion of the brood nest; in other words, as soon as the brood nest becomes overcrowded, the field bees immediately start preparations for permanently leaving the hive. The first step then in swarm prevention is to remove the cause, but, in order to do this successfully, we must study the activities of the bees and through them learn just what brings about congestion or over-crowding. Some beekeepers have done so and natural swarming holds no terror for them, but there are too many that have not studied it and do not know how to prevent or control it. When the weather is right and nectar is plentiful, yet the bees are not going to the fields but clustering around the hive entrance, something is wrong and such conditions should be investigated at once, as they quickly bring about congestion. Some of the factors that bring about this condition of the brood nest are lack of ventilation, insufficient room for the queen or for the storage of nectar, poor combs, small hives, poor queens, etc. If the activities of the bees in relation to swarming were studied more by the beekeepers there would be far less loss from this cause. We must know what the bees do under the swarming impulse before we can control it intelligently. We find that a colony seldom swarms without leaving behind queen cells. This would indicate that if the queen cells are destroyed in time that the colony will not swarm, but this requires too much labour. We also know that a swarm of bees will seldom, if ever, leave without a queen. This fact teaches us that of we can prevent the queen from leaving the swarm will not leave—hence the practice of clipping the queen's wings or of removing the queen from the colony and destroying all queen cells before the swarm issues, and when the impulse dies down, requeening again, a much easier method than periodically destroying queen cells. We also notice that a swarm when hived on empty combs or foundation on a new stand will seldom swarm again—hence to prevent a colony from swarming we put it into a condition similar to that of a newly hived swarm. This known as the Demaree plan.

The wintering of bees is another problem that is an important one in Canada, but through the various studies made of bee behaviour during the winter months it is not now such a difficult one as it was. The winter losses in this country, however, indicate that far too little study is given to the wintering problem by individual beekeepers. There die each year a large number of colonies that could have been saved had a little more care been given them, and for the same reason, many more are so weakened that they are unprofitable the following season. The beekeeper needs to study the requirements of his bees in order to have them winter successfully. He must know that when it is cold the bees cluster together and if it is too cold they must generate heat to keep up the proper temperature of the cluster. He must also know that in order to generate heat stores must be consumed and that if the stores consumed are of poor quality the intestines become clogged with waste material which, in turn, causes more restlessness, higher consumption of stores, more heat produced, energy wasted, which finally result in dysentery and death. A knowledge of these activities is necessary in order that more intelligent care in preparing bees for winter may be given. Colonies must be strong in young bees for the winter in order that they may live through and be strong in spring; and, in order to have the colony

strong in time for winter, it is necessary to study the capacity of the queen, how long she requires to produce the desired number of bees and when normal brood production ceases. Sugar syrup can replace poor stores as it contains no waste material with which to clog the intestines. Protection of the right kind will save the bees from wasting energy and life in the production of heat.

There are many other activities of the bees which, if studied thoroughly by the beekeeper himself, would lead to higher colony production. For instance, the activities of the bees in a queenless colony and what happens if the colony is left too long without a queen, laying workers develop and the colony soon dies out. The safe introduction of queens also depends upon a knowledge of the behaviour of the bees towards new queens under different conditions of honey flow, etc. It is much easier to introduce a queen during a honey flow than when there is nothing coming in. It is also easier before the bees have started queen cells of their own than after. The control of diseases is also based on a knowledge of bee activity and just what will occur under certain manipulation.

In conclusion, let me say that the more we study the occupants of the hive the more we will learn about how to manage our industry successfully. For it is the one with the most knowledge that is in the best position to make the greatest success of beekeeping. Many of you have learned from the bees and are successful but there is an ever-increasing number keeping bees who know very little about them. Courses in apiculture, good books on beekeeping, etc., are all of wonderful help, but after all, the best place to study beekeeping is in the apiary itself.

GEO. S. DEMUTH: A great readjustment has come about since the great war, and I would like to draw a parallel between the industrial readjustment and the agricultural readjustment, if I might. During the Great War, industries were speeded up to a high pitch. Factories took on more help, paid their employees higher wages, paid more for raw material, increased their equipment, borrowed money to put up further plant, and did things at high speed. Agriculture did the same thing. The price of farm land was away up; farmers borrowed money, put in new machinery and pushed production to the limit. All their costs went up. Beekeepers did the same thing. We were asked by the United States Government to speed up the production of honey, because of the shortage of sugar; and away we went. This greatly increased our costs of production, which went sky-high with the higher prices; but the proportionate profits were not there. Still we thought we were doing great things when we were going at that high speed, because our product went away up in price; and those who were able to lay aside something at that time certainly did well.

Along in 1920, 1921 and 1922, we paid for it; and here is where the taxes come in. The industries were a good source of taxation, both in Canada and the United States, and the Governments were wise in getting money where they could in order to conduct the war; and they took from the treasuries of the industries in some cases, as you know, the equivalent of the cost of the entire plant. Even the A. I. Root Company had taken from it the taxes which were the equivalent of all that those men had earned in their lifetime, and we are not through yet. I have in mind a great concern in Ohio which had been paying tremendous dividends. The increases had been going on, with high wages, and the slump came; and they went from bank to bank and at last succeeded in getting new money, to the extent of about eighty million dollars, to be able to operate; and they are trying to pay that back now, and are paying high taxes.

Beekeeping has been doing the same thing. Nobody can help it; but we are in a phase of this movement which is in line with everything else, with one excep-

tion that the industries were quicker to get back than is agriculture, and quicker to get back than beekeeping. How do they do it?

Business men are quicker to readjust themselves than are agriculturists. That is no reflection upon the agriculturist, because his problems are different from those of business men. What did the industries do? They started on a campaign to reduce the cost of production, and they have cut the costs down to the bone. When costs finish getting down to the vanishing point, there are two ways in which to increase profits. One is to get a higher price for your product, and the other is to cut down the cost of production. Let us have both, if it is possible. We are sure of getting good big profits if we can cut down the cost of production.

One way to reduce the cost of production is to increase the yield per colony. Of course we knew that, but we have not gone anywhere near the limit in increasing the yield per colony; because we will not reach that limit until every colony in the apiary produces as much as the best—that is the ultimate limit. When we have 90 per cent. of our colonies producing as much as the best, we know we have come pretty close to the ideal and have cut down the cost of production tremendously.

The first thing for a beekeeper to do, to cut down the cost of management, is to have his colonies big and strong, so that the supers in the sky line will be a straight sky line, instead of like New York City's, up and down, like our apiaries generally appear; then we will have greatly reduced our costs of production.

Every year we have a certain amount of empty equipment. That is impossible to avoid entirely; and yet you and I have seen great quantities of equipment lying empty for a season. Would a business man permit so much capital to lie idle for a year, the way we do? We think that is all right, and we store the hives and combs away in the shop for a year. They are not earning anything. Could a business man afford to have that investment lying idle and not earning anything No, he would say, "I have invested in this perhaps four or five thousand dollars, I will put that where it will earn at least 4 per cent., maybe 5 per cent. and possibly 6 per cent. That empty equipment is eating us up, in some cases" and of course that suggests the other thing, having them filled up.

You say that increases the crop of honey. As I said this morning, the man who specializes in beekeeping cannot afford to cut down his production, because he makes his living out of it. We want to have empty equipment cut down to the minimum. It may be that that will mean buying package bees. You say, "Would you advise me to spend money in order to cut down the cost of production?" Why yes, factories do. Some great manufacturer, Carnegie, I think it was, said if new machines bought last year are out of date this year, and if a new one costing a million dollar bought this year would make a profit, throw away the old and buy the new equipment.

In other words, if you have empty equipment, it might pay you to turn around and pay out good money to buy package bees for that equipment. I did not need to come here to tell you that.

Another illustration of a similar thing is in connection with labour. Nowadays capital is cheap. I am speaking now of the world supply of capital. It is the cheapest thing we have. Labour is an expensive thing. Of the two things which go into the manufacture of an article, capital and labour, labour is the expensive thing, and capital is the cheap thing. Now is the time to take advantage of cheap capital. I used to have to pay 7 per cent. for capital, but now we can get it for 4 to 5 per cent; 5 per cent. in many cases.

I have an illustration in mind, of a very great friend of mine who until recently was a beekeeper as well as a farmer. He had more than he could do on his little farm, with two apiaries. I visited him in the midst of the season, one evening; he had been working in the bee yard during the day; and in the evening he brought in a load of hay, and he and I put that load of hay in the barn at nine o'clock at night; and after we had got that in the barn we closed the doors. The doors were a pile of boards, and it took us quite a while to put them up. I said to him, "Why didn't you make a door last winter?" He said, "It would have cost me three or four dollars to buy material to make that door." I said "Yes, but you would have saved in July, in the middle of the honey flow, several times that much." "Well," he said, "But I didn't have the money."

The agriculturist is very slow to put in capital where it will save labour. We, as beekeepers, have to learn a lesson from the great industries.

On the other hand, I do not mean that you and I ought to be foolish enough to rush in and buy something, when we have not the capital and have to borrow money. Sometimes we have to use labour to tide us over. But the agriculturist is slow about putting in capital which would come right back in profits and save him several times the amount of the outlay a little later on, because he has not been handling things in just that way.

Some of our railroads over in the United States have put on magnificent trains, moving palaces in the way of equipment, spending millions of dollars on equipment on passenger trains running from New York and Chicago across the continent. There is a bathroom, and a tailor to press your clothes, radio to get the stock markets, and all the luxuries that you can imagine. They say it costs more than you can get out of it; but they are doing it just the same. They are business men, and they must charge it up to advertising, or something of that sort, because they say it does not pay.

A few years ago a beekeeper would get a good crop and make a killing. The western type gets pretty chesty if he gets some money in his pockets, and he goes out and buys a great big truck to haul his honey in; it is an expensive outfit, but he says, " I am just as good as the other fellow, and I have got the money and I will buy the truck and show them what beekeeping is." The railroads have been doing like that with their trains.

I would like to take you into my confidence. I have an old 1912 Buick, which goes up and down the hills. I do not know what it is worth. Some years ago I could not sell it for anything; an agent said that on a new car he would allow me $35 for it, and I had just spent a hundred dollars for new tires; but the junk man has not got it yet. It does my hauling. They laugh at me when I am on the road, but I can laugh back because it gets my honey in.

Another thing, on the line of equipment. Two years ago, I believe it was, a beekeeper from Western Ohio wrote me and said, "I understand you spend some time among your apiaries in Indiana. I would like to come out and see you. Now that made me sick. I did not want him to come out and see me, because he would see my old car and other things. I wrote him, "I have just come back and am in Medina getting out the journal." He replied saying, "You will be back there some time." I said, "I am awfully busy." He wrote me and told me he would come at a certain date. All I could do was to show him around. I hope you are not going to ask me to let you come over and visit me in my apiaries, because you would find a lot of things to criticise. I took him out in the bush and showed him a yard there, which was in the midst of the honey flow, while his honey flow had not started; and he said, "What is the matter with your hive stands?" I had had to take the old hive stands, and instead of them being

old boards on edge, when they rotted down I laid them on the flat and put the hives on them; and they did look bad. Then he spent an hour or so telling me how to make hive stands. That was after I had driven about 180 miles to see him. I tried to attract his attention to the supers, and he said "Yes, that looks nice." I had about four comb honey supers on and they looked pretty good. He saw the things I had forgotten all about.

When I go to another beekeeper's yard, the first thing he says to me is, "If I had known you were coming, I would have had things fixed up around here," and that is the first thing I said to this man; I have heard speakers before beekeepers at conventions and advise them to throw away the old equipment and buy good hives. Do not do it. You are in a business in which, if your equipment does not look quite as nice as you would like, the cows in the woods will not pay much attention to its appearance, if inside your hives they are clean, and you have clipped the grass all around the hives, beautifully, like I try to have it at Medina for show, not for honey production. Can you improve the taste of your honey by these things? No. Tell your visitors to stay away, put on your old things and use your old equipment as long as it is efficient. Do not throw away bee-hives because they are a little old or the model is not right.

If I had a half million dollars, I would fix up my apiaries and invite you all down to see them; but please do not come until I have that half million dollars. We used to have extravagant ideas about production, and put in an elaborate equipment. As long as that elaborate equipment brings back dollars, by all means put your capital into it. But rather, let us pinch along on equipment.

The concern I am with is selling equipment, and yet I am here telling you to pinch along with your old equipment, unless it is not efficient. If it pays to put in new equipment, do so. If it would not pay, get along with any old rattletrap equipment, as long as the inside is all right and clean, and easy and efficient to handle.

Whether beekeeping is going to be a great big industry, in which one man controls thousands upon thousands of colonies, or whether it is going to be a one-man sized job, I do not know. My opinion is that in the future there will be a great many beekeepers producing honey on the one-man scale. Honey costs too much to produce right now, when we have to sell at the present price. If we increase our equipment we will have to hire labour, and labour is the most expensive thing which goes into our product. I have a vision of one man working I do not know how many apiaries, himself, with the aid of his own family, without any hard luck. But as quickly as the business gets up so that you have to hire one man, your expenses jump up until you wonder whether you will be able to pull through and make a profit.

I have a vision of, in the future, running into an apiary with a machine perhaps even as badly out of date as my own, and putting that machine down between the rows of hives and doing the heavy lifting with its power. We have no idea of what we can do.

A week or so ago they had a meeting of farmers in Columbus, Ohio. Somebody in Buffalo the other day was complaining about the industry, and one man said, "Be thankful you are not fruit-growers." Another man said, "Be thankful you are not a farmer." We might say, "Be thankful that you are not any of a good many things, except a manufacturer of automobiles and radios." Anyway, there was a deputation of farmers brought in, who had done great things last year. One of them had bought a 40-acre farm and ran the whole thing by himself—every operation was by machinery—and he cleaned up last year, by growing special crops, something like $10,000. Others in that same year, by growing

special crops, had cleaned up eighteen to twenty thousand dollars, in these days when agriculture does not pay. That was accomplished by them using their heads, as well as by using special machinery.

When you hire a man in an apiary, if he is any good he has eyes and he sees things; he sees your location and your outfit; and he works for you for a year; and at the end of that time he thinks he is as well equipped for honey production as you are, and he gets somebody to back him, and he starts in next to where you are and establishes an apiary; so that the man whom you have taught becomes your competitor in your own field. I think some of these days we will dispense with him. and we will be operating our apiaries with machinery.

Another way for a beekeeper to reduce operating expenses is to have a wife; not to go out and carry burdens in the yard, but to facilitate the work of the beekeeper himself.

I have only one son, but he is in Chicago working his head off trying to sell honey right now. Children are expensive, but the beekeeper does not have to pay them a salary.

Another way to greatly reduce the cost of production is by imbibing good ideas. If people from the United States keep coming over here, you may copy some of their bad habits, that is ideas of living that are beyond your means. Over there anyone who is earning a little money is spending money faster than he earns it. They buy on the instalment plan everything from a house to the automobile, including their household furniture and even their clothes—they just mortgage their future. A man who is in debt is a slave to the other fellow. I do not want to mortgage my future for things which I cannot afford; and buying things beyond one's means increases the cost of production. The result is that the fellow who has some money in the bank is the one who can take short-cuts in production; while the fellow who is everlastingly in debt cannot take short cuts in production and gets the raw edge of the deal all the time. It is a good thing to be a good spender and a wise spender, but when it comes to mortgaging our earning capacity and not being able to supply capital to our business when needed, that is greatly increasing our cost of production. There are so many other things which can be done that I cannot classify them all now, and I have talked too long already.

REDUCING COSTS IN HONEY PRODUCTION

A. F. Hodgson, Jarvis, Ont.

The cost of producing honey is determined by two sets of conditions. One set of conditions beyond the control of the beekeeper, and the other reasonably within his control.

Favourable weather is the most important condition affecting the cost of honey production, but alas! it is hopelessly out of our control.

The next important condition is *location to good pasture*. The industrious beekeeper will do his utmost to secure the best locations, yet taken over a province-wide area, this factor of location will also be found to be largely beyond the control of the beekeeper.

We now come to the consideration of those conditions which are reasonably within the control of the beekeeper, in one word, *management*.

Management then is the vital factor entering into the production of honey, and the more efficient the management the less will be the cost of production.

The first factor under management is *personal, the beekeeper himself.* It is sufficient to say that the man who enters beekeeping with the obsession that there is money in the business, will no doubt find that such is the case. His trouble will be to get the money out. On the other hand, if one takes up beekeeping with the love of nature in his heart, such a one will soon grasp the fundamentals and be well on the road to successful honey production.

The next factor of importance is *the bee.* After a number of years of experimental, side by side, comparisons with several races and strains, I have settled down quite satisfied, to work with the three-banded Italian.

The next important factor is *uniformity of supplies,* and we think at once of the hive. This question of the hive has been discussed almost to the point of weariness, yet this very important, but vexed question has not reached the point of exhaustion. Soon or late, however, the successful beekeeper will settle this question definitely on the basis of the economic requirements of a brood-chamber, and the uniformity of bee supplies. A thoughtful consideration will reveal the following. The Langstroth frame, from comparative use has practically become standard for either brood-chamber or super, and there is an immense advantage in adopting one frame throughout.

The next step is to arrive at the number of these combs necessary to accommodate all the various requirements of a brood-chamber. Economy in space will indicate square construction, that is forming a square from the given measurements of the standard Langstroth frame. The result will be a 12 or 13 frame hive.

A brood-chamber patterned from nature will consist of a construction of brood-nest which is contained within one compact enclosure. These considerations of brood-chamber construction will naturally lead one away from either divisible brood-chambers, or food-chambers.

Additional supplies add to the cost all along the line. Economy seeks simplicity.

The next important item of management bearing on the cost of honey production is *the number of colonies kept.*

The greatest number of colonies kept will be determined by adopting a system which will reduce to the minimum the necessary manipulations per colony.

Logically, the greatest number of colonies kept under one successful management will result in the lowest cost of production. However, this introduces at once the factor of labour, which reveals the great weakness in connection with extensive honey production, and this brings us to the observation that although honey is a natural product, commercial beekeeping is passing through a stage of development comparable to industrial development. Honey production is rapidly being placed on a manufacturing basis, and will be compelled to recognize the fundamental principles that govern and control all commercial activity. No longer is it possible for the large producer to close his eyes to such matters as actual investment. interest on investment, depreciation, and cost of labour. As in manufacturing, so in the production of honey, the matter of labour is the greatest item of expense. As it is true of the manufacturer, so it is true of the honey producer; both must choose between unsatisfactory labour and the efficiency of labour-saving machines.

The sight of a good crop of honey on the hives fills us all with pride and satisfaction, and rightly so. It is our reward for the season's work. Our livelihood depends on it, yet no sooner do the supers begin to pile up than we begin to realize that all this bulk and weight is one mass of work, continually in our way. Who would not welcome some magic touch which would instantly convert this un-

desirable laborious work into a cheque from our good friends the Co-operative?

Of course, this is impossible, so the next best thing must be found, which is large capacity extracting equipment.

Nowhere is the saving of time and labour more important. Next season's crop depends on the colony manipulation of the next few weeks. Re-queening must be done, increase to cover losses must be made in time to build up before the close of the season. It is my experience that either queens or bees can be raised here both cheaper and better than buying from the south, owing to the difficulties of transportation.

It is hard to over-estimate the value of time and labour at this season of the year. This crop of honey which we planned and worked so hard to secure is standing in our way. As a matter of fact, from the standpoint of preparing for next season's crop, it is a nuisance, but it can be handled rapidly and well by labour-saving machines.

Briefly the system we practise is as follows: *central plant, bee-escape boards, motor truck,* and *large capacity extracting plant.*

Just a word about the *central plant.* As we observed before, honey production is developing along the lines of manufacturing, and this in itself will necessitate the construction of a central plant.

In regard to the *bee-escape board.* It is the most automatic, time and labour-saving device I know for freeing supers of bees. We have in use 350 of our own design which consists of wire-cloth supported by a suitable rim, and provided with the well known Porter bee-escape.

I scarcely need mention *motor trucks.* It is common experience that the motor-truck has brought the out-yard under practically the same management as the home-yard. It has made commercial beekeeping possible.

The next step after the honey is in the honey-house is uncapping the combs. you will pardon me if I appear somewhat egotistical.

Progress, time and labour-saving demand a machine. After several years of experimenting I am now able to say that the Hodgson uncapping machine is practical. It is both rapid and durable.

The problem in constructing a machine to uncap combs was to design a tool that would stand up under the excessive strain of wear and tear.

The problem was solved when experience taught us that the work of uncapping a comb was almost equivalent to the work done by a wood-working machine.

The next step in cost reduction is extracting. The day of reversible extractors is gone so far as the large honey producer is concerned.

For a number of years I have been working on the problem of capacity extracting, and now I feel confident that the Hodgson extractor will be welcomed by all as the most efficient large capacity machine yet designed.

During the past season, with these two machines, my brother and I made what we believe to be a record's day's run in extracting.

In the honey-house, ready for the run, were 400 supers of 10 combs each. They were just an average lot, consisting of everything from old combs to newly drawn foundation. These combs were spaced while on the hives, 10 combs in a 12-frame super.

We commenced as follows:—Top-bars were scraped, and the supers moved as required to the uncapping machine, on swivel caster trucks.

The combs are then taken out of the regular supers and passed through the uncapping machine, and placed in the supers that are used in the extractor. The extractor has a capacity of 96 Langstroth combs. That is, eight 12-frame supers are loaded into the machine in much the same way as a drawer is slid

into a desk. As fast as 8 of these supers are filled with uncapped combs, the extractor is re-loaded. The time required for unloading and loading is three minutes. That is 8 supers of extracted combs are taken out, and 8 full supers are put in, in three minutes. In about ten minutes the combs are extracted clean.

Although this extractor is a large capacity machine, yet it is very compact, taking up a floor space of only 5′ 6″ x 5′ x 4′ 6″ high.

The extracted combs are very quickly transferred from the supers used in the extractor to the regular supers, by inverting the supers of combs over the edge of a table and removing the super by lifting it up, leaving the combs standing upside-down on their top-bars. The regular super, in an upside-down position, is then placed down over the combs, and then both super and combs are again slid over the edge of the table into an upright position. It can be done quicker than described. This rapid handling of extracted combs is one of the unique features of the Hodgson extractor.

At the end of the day, ten hours, the 400 supers were extracted, and from which we got 16,000 pounds of honey. We averaged slightly over four loads of 96 combs per hour.

Now, I do not wish to exaggerate, but we know that in a good season with practically all combs well filled, that the combs would average at least five pounds, which means that this day's run of 4,000 combs would net 20,000 pounds. In other words, two men with these machines can extract 20,000 pounds of honey in a day.

Let me state in closing, that this whole matter of reducing costs will resolve itself into adopting factory-like equipment, backed up by an energetic system of management.

I believe that, between the time when we commence to take the crop from the hives until the honey is ready for shipment, lies the most hopeful margin of reducing the cost of honey-production.

H. G. Sibbald: A great many beekeepers nowadays are sending away every year quite a bit of their earnings for queens. Mr. Gooderham mentioned that. It seems to me that might be cut out to a large extent by producing your own queens. I am sure that if Mr. McKinnon were here he would mention that, because he is a great believer in the home production of queens.

A speaker yesterday said that when you bought young queens they were not always immune from swarming the first year. I have often wondered why that was, because a queen reared in your own yard and under proper conditions very seldom swarms the first year, unless there were cells already there when she was introduced. I believe that the excitement of the journey in the mails, the conditions under which they are carried in the mails, makes those queens old, in lots of cases; because we often find them being superseded in a month. And the distance they have to come surely must have an effect upon the constitution of the queen, affecting her length of life. It is not a hard thing to raise a queen, and it is one of the nicest parts of beekeeping. As Mr. Gooderham told us, all you have to do is to study some good book on queen rearing and get at it. How many things I have found in my life which have seemed like a mountain until I had got at it; and then after I had got at it it seemed to be as easy as anything, and I have wondered why I did not get at it long ago. Things look so big until you get started at them and solve them; and then you wonder why they stopped you so long.

Another matter which might reduce the cost of beekeeping would be the use of some honey source beside buying so much sugar. In doing that you have to

be very careful. I am not in favour, for Canada, of that large hive with the half supers or the food chamber, because I think it gives too much space in the hive. Still, as Mr. Pettit says, if there is extra protection given in packing, that perhaps would overcome the large inside space to a certain extent; and in ordinary winters you might have a large cluster; and even last winter, if they were in a sheltered place, as he says they wintered well. Buckwheat honey, if it is properly ripened and sealed is all right. If it is not properly capped and sealed it is not good. Neither is any other kind of honey good, because thin honey and unsealed honey is sure to take moisture from the air and become unsuitable for winter stores. That is one of the secrets in the matter of stores, that it must be well ripened, good, thick honey. I have proved to my own satisfaction that buckwheat gathered early and well-seasoned does make good winter stores.

There is another point which I am a little afraid to throw out, but I want to do it in this way: Extracted honey, dark honey, or honey that is a little off in colour can be fed back mixed with sugar syrup. It must be thoroughly liquefied so that there will not be a sign of granulation, and the syrup must be put in and well mixed while it is warm, and it will not granulate. But let me warn you that if you have any American foulbrood in your yard you must not use any of that honey.

Mr. Demuth said that if you have a lot of empty equipment around you should get it into use. That is good business. Perhaps he did not advise you, but he suggested that you might possibly buy package bees. I think that beekeepers in Ontario are sending away for package bees a good deal of money that they might save, because I think there are other ways of making increases. For instance, if you could raise your own queens, raising them in time, you can divide your colonies after the main honey flow, and fill up your equipment, and be in good shape for the next season without having to buy. It is not good business if you have to take all you have made and pay it out again.

Then it is very important that we should save all the labour we can. I do not know whether I am an efficiency expert in that line, but I have heard wonderful things of our friend who has just spoken, about his systematic way of doing his work. Some people are wonderfully systematic, and seem to be able to systematize all their work. I have known farmers who were not very strong men who yet accomplished a lot of work, just because they had a system of doing it, getting at it in the morning before the day was hot, and had all the machinery oiled and everything ready to go right along; and they could accomplish more than their neighbours who were stronger men and who sometimes had more help.

Somebody mentioned that we must have strong colonies. That is right. That just comes along and touches you up on your whole year's management. If you are going to have strong colonies, you have to be on the job and know it and attend to it, and keep your bees in good condition from the spring until the fall, and give them good food for the winter, and winter a very large percentage in each colony so that their constitution will be strong in the spring so that they will be able to increase and take advantage of the season, whether early or late.

F. W. Krouse: It is sure that we have to cut down our costs somewhere if we are to keep in the business. The present price of honey has got so low that it has left barely a living in the business. Now how are you to be able to produce honey at a less cost? It has occurred to me that the only way we can do this is to produce more honey with the same or less labour. To do that, we have to adopt an equipment something like Mr. Hodgson tells us about, where we can handle a lot of honey on the one-man system, as Mr. Demuth called it.

The only way to do that is with machinery. I have been thinking a good deal about what Mr. Demuth spoke of as to being able to go down the line and lift the supers into the truck by machinery. It might be possible. We have seen service cars which are sent out to a car which has been wrecked on the road, and they wind up the derrick and away they go. Why could we not have something like that which would lift our supers right on to the truck? That would save a lot of heavy lifting.

I am very much interested in the extractor which Mr. Hodgson has. I have been down and have seen it working twice, and am hoping to put one of them in for next year, if I am able to get one built which will take two kinds of supers. My difficulty is that I have the standard super and also the jumbo super.

If I can produce more honey with less labour, that is the only way I can see for getting away from our present trouble. With our equipment we have to make a change. I have always advocated extracting at each yard; but I have got to back down on it. We have reached the place where we cannot keep up with the kind of equipment which we have; but with a central plant we ought to be able to do our work faster and with less labour; so that we are planning for that this winter so as to be ready for next year's work.

A Member: What is the best thing to do, if you have quite a lot of weak colonies in the spring, to make them earn something?

Mr. Krouse: We have had more weak colonies this spring than in ordinary years. This year the weak colonies were practically useless. We had more losses last winter than we have had in the previous ten years all put together. The way I figure it out, as an explanation, is that the snow was so deep on the colonies that they got too warm and the bees came outside and died like great swarms sitting on the ground. My idea is that they came out and stayed there until they starved. We had three yards where we lost 90 per cent., and we shovelled them up and brought them home and used them as fertilizer in the garden. They were too strong and got too warm with the quantity of snow on them, and came outside and starved. Any that did live were useless and might as well have died. Other years we could have built up those colonies by taking a little extra care of them, but this year they had lost their vitality so that they were of no use.

Ewart Tucker: This year, if you had a strong yard, could you not have divided it up and have gathered more honey?

Mr. Krouse: That is the way we did it. We do not run more than 40 to 55 colonies in a yard. We think we get as much honey from 50 colonies as we would get from 75 to 100 on the same ground.

A Member: Do you think there would be any advantage in all beekeepers putting all their honey into large barrels and shipping it to a central place, where the honey could all be graded and guaranteed? It would save shipping costs and empty cans.

Mr. Krouse: Shipping your honey all in to one place would be ideal. You could pretty nearly control your grades in that way. We have twenty-two yards of bees, and you might say we have twenty-two grades of honey, because there are hardly any two of those yards where the honey grades exactly alike. Taking our light honey, there will be a difference in each yard in colour or in thickness. If we could run it all into one tank, there would be just the one blend or sample of each grade.

Mr. Hodgson: I have a problem in straining honey. I extract it so fast that I cannot strain it fast enough. I used to think I was doing pretty well

when I extracted four or five thousand pounds a day. I extract so much now that I want a larger strainer. I think I have wasted about $50 in experimenting with strainers. I will tell you about one experiment. I went through all the bee books and looked at all the designs, and thought I had something. I used a large vertical tank, six feet high and thirty inches in diameter, and I put a strainer down near the bottom, almost the full diameter of the tank, with an ordinary screen wire the same as is used in an extractor basket. On that I sewed cheesecloth. From the inside of this I took a two-inch pipe to the ordinary gate. Then up to the middle of the tank and over and down, the ordinary siphon. I closed everything off and started extracting and filled to the top as carefully as I could with clear honey. I made sure that I had my strainer covered with clear honey right to the top. As soon as it commenced to strain and go to the storey below, I thought I had something, and it worked beautifully one day for about 5,000 pounds.

I divided the ordinary two-inch gate, the ordinary opening of the tank, so that when I was at the end of the extracting I could fill from this gate; and I started to do it and was putting the honey up in 5-pound pails. This strainer was made very substantial and flat, and it formed a vaccum. I had to throw it away.

There are a lot of funny things which you learn in straining honey. You can do it in a small way, but when you begin to strain it at capacity, you are up against a problem. If you know, from what you have done, that you could increase the capacity by increasing the capacity of the strainer in any way, I would like to learn something about it, because I would like to be able to design a strainer this winter which will take care of 20,000 pounds in a day. I have a steam boiler and can heat the honey if necessary, but I do not want to do it. Honey is too delicate a product for us to expose it unnecessarily. I like to handle the honey fresh from the hive. Can anyone help me out?

I do not know whether you have ever noticed in a gravel pit or in a coal yard or in a stone mill, where they screen to size, they have different screens. This summer we ran the honey and the cappings both together from the machine into the upright tanks; we allowed it to stand two days in the tanks in the usual way and then canned. I have in mind to let it stand in the usual way, and then start from the top on to another screen until we come to the cheesecloth, hoping in that way we might increase the capacity.

A MEMBER: The greatest trouble is in the wax clogging on the screen?

MR. HODGSON: Yes.

A MEMBER: I have thought that if you had half of the honey coming to the gate, and then had something to swing over which would clear the wax away and then swing back and clear the wax off the other side it might help.

MR. HODGSON: What is the general opinion, is it in favour of a vertical strainer or a horizontal one?

A MEMBER: Vertical; because coming down half of it would have a pressure on a sort of butterfly valve, which would force something across the screen. First it would be down one-half, and then down the other half, forcing something over the screen to clean first one side and then the other. I have thought of that but have never tried it, as I am a carpenter.

MR. KROUSE: What I have in mind in connection with the straining is to use a tank built on the same principle as the wax-division tank is built on, when you are melting wax. Have the honey come in, and have that tank of good size with a hot-water jacket around it. I do not think you can strain it as fast as Mr. Hodgson wants to do without the use of heat. Have that honey come over

the top and siphon out. It would come in with the cappings and everything else and go down under and come up the other side and pass out with the honey warmed into the other big tank; then the honey will strain because it is warm.

MR. HODGSON: I understand you have extracted and canned the same day?

MR. KROUSE: Yes.

MR. HODGSON: What was your biggest day's run?

MR. KROUSE: Nothing like you have done, only about 4,500 to 4,700 pounds.

MR. HODGSON: Did you have anything to bother you?

MR. KROUSE: Only a little scum. If we had been a little more careful we would have got rid of the scum. If we had allowed the last 150 pounds to stand and settle in the tank until the next day, we might have got rid of the scum. But we wanted to get everything out of the honey-house, as we find locks are no good. One night we left honey in the tank, and when we came in the morning, somebody had got about twelve or fifteen pounds, and the rest of the honey was all gone on to the floor.

A MEMBER: Will Mr. Sibbald tell us how he makes his divisions?

MR. SIBBALD: A strong colony can be divided into equal divisions of brood and honey and comb. You can use super combs for part, and divide your brood combs and divide your bees, and leave them side by side, introducing a queen into the one half, and then you have got an equal division; and they will keep on working and both become good colonies. If you have supers which are not fit for brood combs, we have shaken bees on to foundation and taken the brood away and put it on top of another colony, let the bees come up and occupy the brood, and then split that colony. That plan necessitates having a moderate flow; the other does not. Circumstances alter cases. I have no trouble in getting increases at that time of year, because the usual colony which has come through a good season is quite strong.

A MEMBER: What proportion do you use of honey and sugar syrup?

MR. SIBBALD: Sugar syrup perhaps 25 per cent., and honey 75 per cent. If it is well mixed it will not granulate. I would not say that you could not go below 25 per cent. and be safe.

H. A. MARSH: I have had a little experience but do not know whether it would be of advantage to any of the rest of you. There is a question as to how far we had better go in increasing production and reducing costs. It is well for the individual to decrease his costs. I have proved something, I think, to my satisfaction which I think would answer all over Ontario if properly handled. It is somewhat unorthodox. The first thing is, feed no sugar; the second is, buy no expensive cases. Those two things have reduced costs for me during the past six or seven years. When I first started beekeeping it was a get-rich-quick scheme. I found it was costing too much for cases and sugar. I heard about tar-paper cases, so I started to use them, and I thought there was no handling of them until spring. Then I heard about the double super, and I used that—one super full of honey on top, and the tar paper around it. I used the cheapest tar paper I could get, costing $1.10 per hundred feet. Other cases I had no room for a double super, so I had to feed sugar. I have been increasing my tar-paper cases every year. Buying cases and buying sugar is two bad losses to the beekeeper. Invariably my bees have come out better where there is no sugar but a super of good honey. I am up north where we get cold away below zero. It seems to me that with the present conditions of beekeeping it is worth while considering whether you can cut out buying cases and sugar. Tar paper is cheap; and a few hours' work in the spring and you can gather up your paper and burn it.

REDUCING COSTS IN HONEY PRODUCTION

JOHN A. MCKINNON

Eighteen years ago I invested $48.00 for five colonies of black bees and quite a lot of equipment which went with the bees. The original owner of these bees told me it was not possible for a man to make a living with bees in this part of the country.

Local beekeepers at that time were selling honey at 8c. per pound, making no difference in price, wholesale or retail. I raised the price of my honey to 10c., and was very glad at the time to get that price for it. I started beekeeping with the firm idea that if bees were to be made pay at all, they would have to pay their own way after my first outlay, and to that policy I strictly adhered.

I increased my original five colonies to twenty-five the first season, getting some swarms from farmers, who sulphured their bees in the fall, and wintered these on sugar stores.

The second season I increased to eighty colonies and reared and sold enough queens to buy new equipment. Later, when my colonies had increased to the extent that I required extra help, I sold colonies in the spring and queens in the summer to pay for this help and also our living expenses, so that we could count on our honey crop, if we were lucky enough to have one, to be clear money at the end of the season.

I never manufactured any supplies, as I did not care to take the risk of getting some one of my children or helpers hurt in the saws. I adopted the plan of wintering a few extra colonies of bees, selling these in the spring. This I could do in less time and produce better results. I buy my lumber in the rough and have it made up in supplies at our local sash and door factories, which are well-equipped to do this kind of work. We can buy good lumber for hive-bodies to-day for $40.00 to $50.00 per 1,000 feet. I once bought 6,000 feet for $60.00, a good price. Most of these boxes are in use yet. Taking this pine lumber in the rough, delivered at the mill, we pay from 10c. to 12c. per hive-body for manufacturing; 8c. for covers and bottom boards. Ten feet of this lumber will make two hive-bodies at a cost of about 35c. each. We buy our frames ready-made locally. I have bought a good many Hoffman frames at $20.00 per thousand. Of late years I have had to pay more, up to $30.00. Last spring I got 1,000 Jumbo-Hoffman frames, split bottom bars, at $35.00, and we save freight. One time I bought a carload of pine lumber which I had made up. Comparing prices, I found that I had made a saving of $1,040.00, and one-way freight, which would be quite an item.

I don't want to leave the impression that supply manufacturers are charging too much for their supplies. I believe they pay more for their lumber, then there is the extra cost of boxing, storage, freight and overhead charges, which all goes to increase the cost, but the bees don't seem to know the difference. They will store as much honey in a box that costs 25c. as one that costs $1.50.

We try to save on operating expenses, to operate our 600 colonies. We require one good helper who understands bees and is fairly reliable. We also require a second helper, but it is not absolutely necessary that he be overcharged with brains, as long as he is strong and willing and every day on the job. We are satisfied to get the most out of our helpers. We never ask them to work long hours, beginning in the spring and throughout the season. We try to work fast, and when working at outyards, if we finish early, we are through for the day, and, if the weather is warm, we take the car and go down to the river for a

swim. I find that my helpers appreciate this and we accomplish more. I never ask a man to do unnecessary work for the sake of putting in time. They soon understand my style of working, and know when it is time to work or time to loaf. There is nothing that will make helpers dissatisfied quicker than asking them to do unnecessary work to kill time. I find that boys who are used to doing outdoor or farm work make the most use of their brains in doing their work, also in their observations. To illustrate this, I had an agricultural student from one of our lower provinces one season. He knew nothing about the different clovers or their value to the bees. Another time I had another college graduate, one of the most willing workers I ever saw. I left him to his own resources at cleaning some frames one day. Two hours after he had started the job, I came around to see how he was getting along, and he made the remark that the time he was putting on the frames was worth more than the work he was accomplishing. I counted his finished frames. Taking the same number, I said, "Let me try and see if we cannot, by a different method, do this work a little faster," and I did in eight minutes what he had spent two hours at.

We plan to lessen the cost of production in all our operations. This fall it cost me $7.75 to put in cellars and trenches, four hundred and seventy-five colonies of bees. We also took down our summer windbreak and stored the lumber. This work was all done in two days. We save on operating expenses by keeping enough colonies in one yard to make a day's work, by rearing from the best of our own queens, thereby increasing the yield per colony.

Taking advantage of the roads, when they are good, and landing enough supplies at each yard to do us for the season. This includes prepared smoker fuel, which is placed where it cannot get wet, queen-excluders, drawn combs, extra covers, bottom boards, etc. This work is all done before the rush season, and supers are placed in different parts of the yard to save unnecessary delay in handling while working with the bees. We also use every device or plan known to us to lessen the work, such as a table at each yard, also a hive-lifter, handling combs only when it is necessary, in the case of queenlessness or swarming fever.

One thorough examination in the spring for disease and queens, then doing only the necessary for the balance of the season. I keep no books. My banker can do that for me at less cost. That's what banks are for. When I return from an outyard and I make a few notes of the work done on that date on the end of the honey-house, which might read like this: June 10th—Brown yard, 3.2.5. cols.; 4 bars; cells in hives 78, 34, 40, 32; and that is all I need know, as I have trained my memory to the extent that one glance through the yard will give me the thread that connects the whole thing.

We also make short work of any disease that may appear in the spring, and would much rather sacrifice a few colonies than to try and keep our supers separate throughout the season. When I go into a man's beeyard, on inspection work, and am shown an elaborate system of little details, such as the number of frames of brood in each colony on certain dates, the keeping of the same supers on each colony from one year to another, etc., I am satisfied that I have met a good beekeeper, but I also know that he will never flood the market with surplus honey, and if he does produce a crop, the necessary help that it takes to care for bees by that system will eat so much of his profits, that he will not have enough profit in a good year to tide him over the poor ones.

The wages paid in any one season for the operating of my six hundred colonies would not exceed $450.00.

I figure that the experience that my helpers get in one season's work in my bee yards is worth more to them than the wages received. It has taken me years

to sift the wheat from the chaff, and a lot of experiments have cost me time and money. A season of practical experience in the handling of bees and queens on a large scale and starting right is worth a good deal more than the time spent in acquiring it.

Now I am going to throw a monkey wrench in the machinery here, by telling you that the book theory recorded by many writers, that honey bees will recognize a strange queen by a different odour, is all bunk.

A MEMBER: How do they recognize a strange queen?

THE CHAIRMAN: We would like Mr. McKinnon to explain that last sentence of his.

MR. MCKINNON: It is a pretty hard thing to explain, because there are some things about the bee business that you cannot explain. It is more of an instinct than a knowledge, knowing when a colony or a frame of bees is going to accept a queen or is not. I have introduced thousands of queens, and the only use I have for a queen cage is to hold the queen while she is being transferred from one yard to another. Very often in the home yard I do not take the trouble of placing the queen in the cage, but carry her in my hand. There is a young man in the back of this room who was with me a season, and during the season we introduced, I suppose, four or five hundred queens, and I do not suppose we lost more than half a dozen in the whole year. If a queen is lost, I believe it is more the fault of the queen than of the bees. I take the precaution to see that she is laying.

There is a big difference between the strains of queens. Some queens are very quiet when dropped on the comb. We take the precaution of taking the comb out of the hive and leaving it outside of the hive for a few minutes, while going over the combs looking for queen cells and cutting off any there may be. By the time you are through with your smoker, the bees are in prime condition, honey flow or no honey flow, it makes no difference; that comb of bees which is on the outside of the hive is in the same condition as bees would be in during the honey flow; but if you place that frame in the hive and allow them to disgorge themselves, they are in a fighting condition. If you allow them to gorge themselves, they settle down and everything is all over.

THE SECRETARY: Will you tell us how you put her on the comb?

MR. MCKINNON: I clip the queen's wings, to make sure she does not fly away. If we haven't a knife or a pair of scissors, if she does fly away I shake the bees at the entrance, and in three or four minutes she comes back. I never look for her. We drop the queen in the centre of the comb among the bees, and we watch the actions of the bees to see what they intend to do with her. The queen may be frightened and may refuse to be introduced. She may duck her nose down in the honey and be a little balky. We watch her for a second or two and just as soon as the bees recognize the queen and begin to feed her and she puts out her tongue and is willing to be fed, we consider the queen is introduced and is all right.

THE SECRETARY: That refers only to queens from your own apiary—not to queens received through the mail?

MR. MCKINNON: I bought half a dozen queens from the south, and one hour after they arrived I went through my queenless colonies—it is only right to say that they had been queenless for nine days. I took the queens into the honey-house and clipped them, and then took them and introduced them and did not lose a single one of them.

E. T. BAINARD: In what distance do you consider it practicable to operate out-apiaries?

MR. MCKINNON: About five miles. If you have a really good location, I think 200 colonies is not too much for profit, if you have the yards five miles apart.

MR. BAINARD: What is the furthest distance that you have them?

MR. MCKINNON: My furthest distance would be about sixteen miles, on a good road. While there is plenty of disease in our district, it is European foulbrood, and European foulbrood will go very far toward eating up your profits in a season. If a colony has European foulbrood early in the season you will have no profit from them. We have no buckwheat honey and they cannot build up a surplus, and it does not take very many cells to spoil the usefulness of a colony.

A MEMBER: Do you use a central extracting plant?

MR. MCKINNON: Yes.

A MEMBER: What do you consider the cost of building one for five or six hundred colonies?

MR. MCKINNON: My plant, with a cement floor, 43 by 23 feet, of two storeys, about 20 feet high, cost me in the neighbourhood of $800. I got one of my neighbours, who was a carpenter and a jack of all trades, to build the foundation and put up the building complete, with two rows of boards and one coat of paint. He gave me an offer to do it for $125, and I told him to go to it. We delivered everything on the ground and he put up the building. It cost me in the neighbourhood of $800 finished, windows and all, with two cupboards, and with a sliding door dividing the building in two; and upstairs a small room was divided off. We use the upstairs only for storing frames and odds and ends.

A MEMBER: Some people have trouble with max woths. Last year I stored frames, covering them with tar paper, and with tar paper underneath and on top, storing them after I had extracted them.

MR. MCKINNON: Wax moths seems to be more attracted by combs with pollen.

MR. KROUSE: I have never had any trouble if the combs did not have pollen.

MR. MCKINNON: The most danger from wax worms occurs in colonies which have been taken off in July. We do not begin extracting until we are all through and are satisfied that there is no more honey coming in. Then after we extract, those combs do not go back on again. We have supers and combs sufficient to hold fifty tons of light honey, which is more than we have ever had. We store those combs in the honey-house about the latter part of July. I believe in having the combs cleaned up by the bees, as it saves fermentation the next year. About a week or eight days afterwards we use ten-pound pails on top of the piles of supers in the yard, and put in a pretty good quantity of carbon bisulphide; by that time the wax larvae are hatched, and then we are through with them.

MR. HODGSON: This summer I found that by storing supers in the basement of our building, which has a temperature, I would guess, of 65 or 70 degrees, we had no trouble, although we had something like 1,500 supers in there. Of course we had to poison the mice. Do you not think the eggs are in the combs before they are stored?

MR. MCKINNON: Yes, and then the larvae hatch after the combs are stored away.

Ontario Department of Agriculture

FIFTY-SEVENTH ANNUAL REPORT

OF THE

Entomological Society

of Ontario

1926

PRINTED BY ORDER OF
HON. J. S. MARTIN, Minister of Agriculture

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

CONTENTS

PAGE

Officers for 1926-1927 4

Financial Statement 4

Annual Meeting 5

Report of the Council 5

Report of the Montreal Branch 7

Report of the British Columbia Branch 7

Report of Insects for the year, Division No. 1: C. B. Hutchings 7

A Study of *Balinus obtusus* Blanchard; or, a Life History in a Hazel Nutshell: C. B. Hutchings 9

Mosquito Control at Ottawa, Ontario: C. R. Twinn 12

Paradichlorobenzene as a Control for the Mushroom Mite: L. Caesar 17

Notes Upon the Insect Preparations Used in Class Work at the Oka Institute of Agriculture: Rev. Father Leopold 19

The Activities of the Division of Foreign Pests Suppression: L. S. McLaine 20

Some Preliminary Observations on the Life History of the Armyworm, *Cirphis unipuncta* Haw.: H. F. Hudson and A. A. Wood 22

The Spread and Degree of Infestation of the European Corn Borer in Canada, 1926: W. N. Keenan 24

The Occurrence of the European Corn Borer in Ontario in Plants Other than Corn and its Significance: J. Marshall 28

The Larval Mortality of the European Corn Borer in 1926: James Marshall 33

The European Corn Borer—The Outlook in Ontario: L. Caesar 35

The Currant Fruit Fly, *Epochra canadensis* Loew, in Manitoba, Diptera, Trypetidae: A. V. Mitchener 38

An Outbreak of the Turnip Aphid (*Aphis pseudobrassicae* Davis): L. Caesar 41

Some Notes on the Oviposition Habits of the Tarnished Plant Bug, *Lygus pratensis* Linn, with a List of Host Plants: R. H. Painter 44

The Entomological Record, 1926: Norman Criddle 47

Index 63

Entomological Society of Ontario

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Editor of "The Canadian Entomologist"—Dr. J. McDunnough, Entomological Branch, Ottawa.

Delegate to the Royal Society of Canada—The President.

FINANCIAL STATEMENT

For the Year Ending October 31st, 1926

Receipts	
Cash on hand, 1925	$468 27
Subscriptions	525 45
Members' dues	176 45
Advertisements	79 00
Back numbers	61 69
Bank Interest	7 89
Annual meeting	1 33
Government grant	1,000 00
	$2,320 08
By cash on hand	462 24
To printing account payable	115 00
Net balance	$347 24

Expenditures	
Printing	$1,410 00
Salaries and honoraria	250 00
Expense	52 23
Annual meeting	109 37
Cuts	19 70
Exchange	16 54
Balance cash on hand	462 24
	$2,320 08

Respectfully submitted,

Reg. H. Ozburn,
Secretary-Treasurer.

Entomological Society of Ontario

ANNUAL MEETING

The sixty-third annual meeting of the Entomological Society of Ontario was held at the Ontario Agricultural College, Guelph, Tuesday and Wednesday, November 16th and 17th, 1926.

The morning and afternoon meetings were held in the Entomological lecture room, Biological Building. The smoker on Tuesday evening was held in the Faculty Club Room, in Memorial Hall.

REPORT OF THE COUNCIL

The Council of the Entomological Society of Ontario begs to present its report for the year 1925-26.

The sixty-second annual meeting of the Society was held in Ottawa on Friday and Saturday, November 27th and 28th, 1925.

The meeting was very well attended by members of the Society from various provinces and by a large number of visitors.

The morning and afternoon meetings were held in the exhibition room of the Entomological Branch. The Friday evening meeting was held in the Assembly Hall of the Normal School when Dr. J. H. Grisdale acted as chairman and Dr. W. E. Britton, State Entomologist of Connecticut, delivered the public lecture on "Some Insects and Entomologists." A moving picture film showing "Depredations by the European Corn-borer" was then shown. After this meeting a smoker was held at the University Club, the freedom of which had been extended to the members.

The programme was full and interesting.

"Insects of the Season in Ontario" (by title)—Messrs. L. Caesar, Guelph, Ont., and W. A. Ross, Vineland Station, Ont.

"Insects of the Season, District No. 1, Ottawa" (by title)—Mr. C. B. Hutchings, Entomological Branch, Ottawa.

"Insects of Quebec" (10 minutes)—Rev. Father Leopold, La Trappe, Que.

"The Control of the Grape Berry Moth" (10 minutes)—Mr. W. A. Ross, Entomological Branch, Vineland Station, Ont.

"The Rose Scale in British Columbia" (10 minutes)—Mr. W. Downes, Entomological Branch, Victoria, B.C.

"The Oriental Peach Moth in Canada" (10 minutes)—Mr. Arthur Gibson, Entomological Branch, Ottawa.

"Derris as an Insecticide" (15 minutes)—Messrs. A. Kelsall, J. P. Spittal, R. P. Gorham and G. P. Walker, Entomological Branch, Annapolis, N.S.

"Lubricating Oil Sprays" (10 minutes)—Mr. W. A. Ross, Entomological Branch, Vineland Station, Ont.

"Some Impressions Entomological and Otherwise in Relation to Prince Edward Island Agriculture" (10 minutes)—Mr. A. G. Dustan, Entomological Branch, Ottawa.

"Record of an Earwig New to Canada" (6 minutes)—Prof. G. J. Spencer, University of B.C., Vancouver, B.C.

"Notes on Mosquitoes in the Ottawa District, Ont." (8 minutes)—Mr. C. R. Twinn, Entomological Branch, Ottawa.

"A Preliminary Revision of some Charopsinae, a subfamily of Ichneumonoidea or Ichneumon Flies" (by title)—Mr. H. L. Viereck, Entomological Branch, Ottawa.

"The Identification of Adult Lepidopterous Insects Attacking Stored Products" (10 minutes)—Mr. C. H. Curran, Entomological Branch, Ottawa.

"Variation in Heredity in *Bruchus quadrimaculatus* Fabr." (15 minutes)—Dr. J. K. Breitenbecatr, McGill University, Montreal.

"The Distribution of Insects and the Significance of Extralimital Data" (15 minutes)—Dr. E. P. Felt, State Entomologist, Albany, N.Y.

"Birds from an Entomologist's Point of View" (10 minutes)—Mr. Norman Criddle, Entomological Branch, Treebank, Man.

"Some Problems in the Anatomy and Physiology of *Grylloblatta*" (30 minutes)—Dr. E. M. Walker and Dr. Norma Ford, University of Toronto, Toronto, Ont.

"The Canadian National Collection of Insects" (10 minutes)—Dr. J. H. McDunnough, Entomological Branch, Ottawa.

"Methods of Measuring Light in Field and Experimental Entomology" (5 minutes)—Mr. A. Brooker Klugh, Queen's University, Kingston.

"The Distribution in Canada of a European Scavenger Fly, *Muscina pascuorum* Meig (5 minutes)—Mr. C. H. Curran, Entomological Branch, Ottawa.

"A Needed Revision in Relation to Generic Names" (10 minutes)—Dr. E. P. Felt, State Entomologist, Albany, N.Y.

"Observations in Quebec in 1925" (10 minutes)—Mr. George Maheux, Provincial Entomologist, Quebec, Que.

"Some Insects found on Imported Plant Products entering Canada by Rail and Road" (8 minutes)—Mr. R. W. Sheppard, Entomological Branch, Niagara Falls.

"Controlling the Brown-tail Moth in Nova Scotia" (8 minutes)—Mr. F. C. Gilliatt, Entomological Branch, Annapolis, N.S.

"The Gypsy Moth Situation in Quebec" (8 minutes)—Messrs. L. S. McLaine and S. H. Short, Entomological Branch, Ottawa.

"Progress of the Gypsy Moth Barrier Zone Work" (15 minutes)—Mr. H. L. McIntyre, in charge of Gypsy Moth Work, Conservation Commission, Albany, N.Y.

"Insects Affecting Shade Trees on the Prairies" (8 minutes)—Mr. J. J. de Gryse, Entomological Branch, Ottawa.

"Some Notes on *Bucculatrix canadensisella* Chamb." (5 minutes)—Mr. C. B. Hutchings, Entomological Branch, Ottawa.

"Forest Insect Conditions in Newfoundland" (10 minutes)—Dr. J. M. Swaine, Entomological Branch, Ottawa.

"Notes on the Yellow Striped Oak Caterpillar, *Anisota senatoria* A. & S." (5 minutes)—Mr. Arthur Gibson, Entomological Branch, Ottawa.

"A Preliminary Announcement on the Outbreak of the European Pine Shoot Moth" (5 minutes)—Mr. L. S. McLaine, Entomological Branch, Ottawa.

"Environmental Studies Relative to the Overwintering Mortality and Rate of Pupation and Emergence of the European Corn Borer Larva" (10 minutes)—Mr. G. A. Ficht, University of Western Ontario, London, Ont.

"Mortality of the European Corn Borer Adults and Larvae" (10 minutes)—Mr. Lawson Caesar, O.A.C. Guelph, Ontario.

"The Spread and Degree of Infestation of the European Corn Borer in Ontario in 1925" (8 minutes)—Mr. W. S. Keenan, Entomological Branch, Ottawa.

"An Appraisal of the European Corn Borer Investigations as Carried on by the Entolomogical Branch" (8 minutes)—Mr. H. G. Crawford, Entomological Branch, Ottawa.

"Weed Infestation by the European Corn Borer" (5 minutes)—Messrs. L. Caesar and James Marshall, O.A.C., Guelph.

"Recent Developments in the Introduction of Parasites of the European Corn Borer" (8 minutes)—Mr. A. B. Baird, Entomological Branch, Chatham, Ontario.

"Studies of the Clover Leaf Curculio" (5 minutes)—Mr. H. F. Hudson, Entomological Branch, Strathroy, Ontario.

"The Striped Cucumber Beetle, *Diabrotica vittata* Fabr." (8 minutes)—Mr. James Marshall, O.A.C., Guelph.

"The Garden Insects of 1925 with Special Reference to the Celery Leaf Hopper" (10 minutes)—Mr. Lionel Daviault, Macdonald College, Que.

"Parasites of the White Grubs and June Beetles in the Hemmingford District" (10 minutes)—Mr. G. H. Hammond, Entomological Branch, Hemmingford, Que.

"Notes on *Calligrapha elegans*" (5 minutes)—Mr. R. M. White, Entomological Branch, Treesbank, Man.

"Notes on the Life-history of the Clover Root Borer" (5 minutes)—Mr. H. F. Hudson, Entomological Branch, Strathroy.

"The Saskatoon Sawfly, *Hoplocampa halcyon* Norton" (5 minutes)—Mr. R. D. Bird, Entomological Branch, Treesbank, Man.

The Canadian Entomologist, the official organ of the Society, completed its fifty-seventh volume in December last. This volume contained 312 pages, illustrated by eight full page plates and twenty-two text figures. The contributors to its pages numbered forty-four, and included writers in British Columbia, Alberta, Manitoba, Ontario, Quebec, Honolulu, France, and thirteen of the United States.

REPORT OF THE MONTREAL BRANCH

The fifty-third annual meeting of this Branch was held on May 15th, 1926, in the Lyman Entomological Room, McGill University.

Eight meetings were held during the season in the Lyman Entomological Room and residences of members, with an average attendance of seven.

The following papers were read during the year:

"Classification"	Geo. A. Moore.
"Entomological Notes"	Geo. A. Moore.
"Insects Collected at Peake's Island, Maine"	Geo. A. Moore.
"Two Interesting Wasps"	J. W. Buckle.
"Insects Taken at Lac L'Achigan"	A. F. Winn.
"Hemiptera of Peake's Island"	G. A. Moore.
"Aquatic and Semi-aquatic Hemiptera"	G. A. Moore.
"The So-called Auditory Organs of Insects"	A. F. Winn.
"Genetics of Bruchus"	Dr. J. K. Breitenbecker.
"Ground Bugs" (Geocoridae)	Geo. A. Moore.

The following were elected officers: President. Geo. A. Moore; vice-president, G. H. Hall; secretary-treasurer, J. W. Buckle; council—G. Chagnon, A. C. Sheppard, A. G. Winn and G. Fisk.

J. W. BUCKLE, *Secretary.*

REPORT OF THE BRITISH COLUMBIA BRANCH

The twenty-fifth annual meeting was held in the Empress Hotel, Victoria, B.C., on February 27th, 1926.

The following papers were read:

"Presidential Address"	L. E. Marmont.
"Observations on Some Insects Collected in British Columbia"	O. Whittaker.
"Notes on the European Earwig in Vancouver"	J. Stanley.
"Recent Methods in the Control of the Strawberry Root Weevil"	W. Downes.
"Some Blood-sucking Flies of British Columbia"	E. Hearle.
"Recent Records of Insects of Veterinary Interest"	E. A. Bruce, V.S.
"Leaf-roller Parasites in the Okanagan Valley"	E. P. Venables.
"Insect Studies"	G. J. Spencer.
"Some Ants and Their Habits"	E. R. Buckell.
"On the Life History of the Hop-plum Aphis"	R. Glendenning.

Five new members were elected and the financial statement showed a credit balance of $194.25.

The election of officers resulted as follows: Honorary president, F. Kermode; president, J. W. Winson; vice-president (coast), G. J. Spencer; vice-president (interior), E. R. Buckell; advisory board, Messrs. Downes, Hardy, Lyne, Venables and Whittaker; secretary-treasurer, W. Glendenning, Agassiz, B.C.

REPORT OF INSECTS FOR THE YEAR 1926

DIVISION No. 1, OTTAWA DISTRICT—C. B. HUTCHINGS

The following more important insects were reported during the past season, 1926.

FIELD, CROP, AND GARDEN INSECTS

The European Corn Borer, *Pyrausta nubilalis*, Hubn., has spread eastwards into Quebec Province, being found this past summer in the Townships of Eardley, Hull and Templeton, Quebec, adjacent to the Province of Ontario, and in

Carleton and Russell Counties, Ontario. The infestation is reported to be light.

Injury by the Imported Cabbage Worm, *Pieris rapae* L., was very marked in fields around Billings Bridge, Ontario and at Aylmer, Quebec.

Turnip foliage was injured very severely by larvae of the Diamond-back moth, *Plutella maculipennis* Curt., over 50 per cent. of the leaves being attacked.

The Four-lined Plant Bug, *Poecilocapsus lineatus* Fab., was particularly abundant in July and caused loss in gardens around Ottawa. It was considered one of the most destructive insects of the year and its excessive foliage-feeding on a wide variety of plants caused many complaints.

Grasshoppers. The fields around Aylmer district this fall were infested with swarms of grasshoppers. *Melanoplus bivittatus* Say., and *M. femur-rubrum* DeG., were chiefly in evidence.

The Raspberry Cane Borer, *Oberea bimaculata* Oliv., was reported from many areas as being particularly numerous and injurious and many inquiries were received as to its control.

The Onion Maggot, *Hylemyia antiqua* Meig., was abundant generally and did much damage, but was more severe in the district of Aylmer than other localities.

Colorado Potato Beetle, *Leptinotarsa decemlineata* Say., was numerous in all potato fields and accounted for much loss by severe defoliation.

There were many complaints received from gardeners concerning borers in Columbine and Iris. The former insect was very abundant at the Central Experimental Farm while the latter was found in suburban nurseries.

Wherever parsnips were grown for seed, the Parsnip Webworm, *Depressaria heracliana* DeG., was numerous. This was particularly the case at the Central Experimental Farm where considerable loss was accounted for.

Tarnished Plant Bug, *Lygus pratensis* L., was much more numerous than last year and on a wide range of crops, though there appears to have been no special injury credited to this insect.

Cabbage Maggot, *Hylemyia brassicae* Bouche, was present in a large number of gardens and caused much loss.

Slugs were exceedingly numerous in August at the Central Experimental Farm and southern parts of Ottawa. Garden vegetables such as tomatoes and cabbages showed 100 per cent. infestation.

Shade Tree Insects

The Maple Leaf Cutter, *Paraclemensia acerifoliella* Fitch, was fairly abundant on maples in Ottawa City and the surrounding districts this past summer. It was noticed to be decidedly on the increase.

Tent Caterpillars, *Malacosoma americana* Fab. and *M. disstria* Hb., were abundant in June on apple, chokecherry and other hosts. They were particularly numerous in the districts surrounding Aylmer.

The larvae of a sawfly (species unidentified) defoliated viburnums in the Gatineau Point District, Quebec, during midsummer.

The Spring Cankerworm, *Paleacrita vernata* Peck, was abundant on soft maples, elm, ash and other hardwoods in the Gatineau and Rockcliffe districts.

Many complaints were received during late summer concerning the disfigurement of lilac bushes by caterpillars of the Lilac Leaf Miner, *Gracilaria syringella* Fab.

During the latter part of September, wild plums, *Prunus nigra*, in different districts about Ottawa were completely stripped of their foliage by the larvae of an unidentified species of sawfly.

Miscellaneous

Mosquitoes were particularly troublesome in Rockcliffe, northern sections of Ottawa, and outlying villages during spring and early summer. This was due to a heavy migration of mosquitoes from the Gatineau Point and Kettle Island flood water areas, the mosquitoes being carried by the prevailing winds across the Ottawa River. The species concerned in this connection was *Aedes hirsuteron* Theo. During the latter part of July, *Aedes vexans* Mgn., was numerous in the west sections of Ottawa.

During April and May the adults of the Webbing Clothes Moth, *Tineola bisselliella* Hum., were quite numerous in Ottawa houses. The Case-making Clothes Moth, *Tinea pellionella* L., was also taken.

House flies, *Musca domestica* A., were more abundant this summer in Ottawa than for several years past. From midsummer until late fall they proved troublesome.

During September and October, the Cat Flea, *Ctenocephalus felis* Bouche, was present in a number of houses in Ottawa and caused considerable annoyance in its attacks upon human beings.

A STUDY OF *BALANINUS OBTUSUS* BLANCHARD; OR, A LIFE HISTORY IN A HAZEL NUTSHELL

C. B. Hutchings, Entomological Branch, Ottawa.

There are a number of species of the weevil group which attack the fruit of nut-producing trees, and which are of considerable economic importance. Many of these belong to the genus *Balaninus*. For example—*Balaninus quercus* Horn feeds on the acorns of red and black oak; *B. caryae* Horn infests hickory nuts; *B. rectus* Say and *B. proboscidus* Fab., both are considered serious enemies of chestnuts. Still another member of this genus is *B. obtusus* Blanch, which chooses the fruit of the hazel for its food, and as a consequence causes a great deal of injury and loss in output of this popular table dessert. In view of the comparatively recent development of the nut-growing industry in Ontario and British Columbia, this last mentioned species becomes one of special importance economically and worthy of some consideration.

Nut growing in Canada in the past has been somewhat neglected, but is now receiving considerable attention, particularly in the Niagara Peninsula, Western Ontario and British Columbia. Walnuts, hickories, hazels and other varieties are being grown successfully with increasing returns and good profits.

The Ontario Department of Agriculture, recognizing the possibilities of such an industry, and with the purpose of assisting the present growers as well as encouraging others to take up this business, have already done a great deal of experimental work in crossing varieties, in cultural methods and in determining the best growing areas. It is very gratifying to learn that considerable success has already attended these efforts.

The hazel is one of the varieties that has received some attention. It is considered one of the hardiest and easiest grown of our nut producing trees. Not only does it thrive in the Niagara belt and other sections of Ontario, but is found growing as far north as Hudson Bay and in the Peace River District. A number of introduced varieties of filberts and cobnuts, from England and Southern Europe, have done well in different parts of Ontario and the results have proved encouraging.

This work has been under the direct management of Mr. Jas. A. Neilson, horticulturist at Vineland Station, who is quite an enthusiast. Those who have seen the interesting exhibition of nuts at the Royal Winter Fair, Toronto, for the past two seasons must have been favourably impressed and surprised to learn of the large number of varieties of nuts that could be grown in Canada, and the size and quality of the different kinds.

The following figures, supplied by the Department of Customs and Excise, show the amounts and value of nuts imported into Canada for the years 1923, 1924 and 1925 from various countries.

It will be seen that hazelnuts represent on an average of 10 per cent. of the bulk imported for the three years mentioned.

Nut Imports*	1923		1924		1925	
	lbs.	$	lbs.	$	lbs.	$
Unshelled	6,745,662	723,141	6,689,984	670,879	5,218,004	581,214
Shelled	5,646,286	1,681,769	7,363,951	1,649,115	7,180,369	2,207,051
Total	12,391,948	2,407,910	14,062,935	2,319,994	12,398,373	2,788,265
Of which were hazelnuts	1,382,027	113,702	1,514,008	84,871	957,580	95,835

LIFE HISTORY AND HABITS: An opportunity of studying *B. obtusus* Blanch occurred during the summers of 1924 and 1925. A number of bushes of *Corylus rostrata* Ait., the beaked hazel, growing near the Dominion Entomological Field Station at Aylmer, Que., were found badly attacked by this weevil. A series of observations on its life history and habits were made and some adults collected for study. This work was done in co-operation with Mr. C. E. Yauch, my summer assistant, for whose help in this connection I am obliged.

It was observed that during the early days of June the weevils were to be found often in pairs, resting on the old flower heads or leisurely walking over the bracts nearby. They were very shy and had to be approached cautiously, otherwise, at the least jarring of the foliage, or sudden appearance of a hand over them, they would instantly feign death, roll off the leaf and fall to the ground where they would be lost to view among the dead leaves. If, however, the observer approached slowly, he could get near enough to see the weevils at work. A look-out was kept for eggs and these were found as early as June 10th, although no indications of mating were noted before June 21st. The young hazelnuts at this time were about 3/16″ in diameter and the outer shell very soft. Egg punctures were readily detected by the brownish spot on the side of the husk. Some of the nuts had a number of feeding punctures (irregular roughened surface areas) while others only one or two; but excepting an occasional specimen, all nuts showed signs of attack by this date. Punctures were more numerous toward the tip of the nut.

The eggs were deposited near the outer surface of the nut, within the area which later was to be the hard shell, one egg only in each puncture. About July 10th the adults had disappeared and the last of the eggs were hatching. On August 13th several larvae examined at that time appeared to be about full-grown. Each had made a simple tunnel into the kernel, gradually enlarging the gallery as it went, and this to such an extent that in some cases little

*Peanuts and cocoanuts not included in this list.

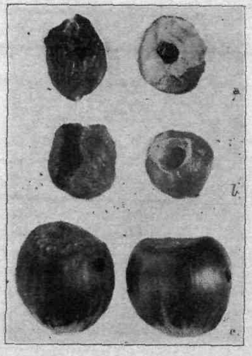
of the kernel was left. These "wormy" nuts later would drop to the ground and the larva in each case leaving its strong good storehouse through a small round hole about midway in the side of the nut and burrowing into the earth.

The winter is passed in the larval stage within a loosely constructed earthen cell just below the surface of the ground, and the weevils emerge the following June.

The adult is about ¼" long, robust in form and of a light grey colour. The snout or beak of the female extends approximately half the length of the body (the male's being shorter), and at the end of this odd-looking projection is a pair of short, pointed jaws which the weevil uses to dig down into the young nuts for food.

The egg is somewhat elliptical in outline, with a smooth and shining surface, whitish in colour and partly transparent. It measures 1 mm. in length.

1



2

1. Hazel nut weevil, *Balaninus obtusus*. Blanch. (×2½ approx.)
2. (*a* and *b*) Nut kernels severely injured by larvæ.
   (*c*) Hazel nuts showing larval exit holes. (×1½ approx.)

The full-grown larva or grub is of a dull white colour about 7 mm. long, the body plump, concavely rounded on the ventral side and without legs; the head being provided with a pair of short, strong jaws.

CONTROL: As the adults feign death readily, this habit can be utilized to trap them. By simply jarring the bushes the weevils fall on a paper or sheet spread on the ground beneath, or will drop into an open umbrella held so as to catch them. After the larva enters the nut it is impossible to get at it; so that defective nuts should be removed from the bushes and any nuts which have fallen to the ground gathered up and burned. Cultivating the soil in spring will expose many of the larvae since they pupate near the surface.

In stored products where the larvae are known to be working, treatment by fumigation with carbon bisulphide will be found a good control. The nuts should be placed in an air-tight receptacle with a small quantity of the liquid poured into a dish, one ounce to the bushel, and then left undisturbed for forty-

eight hours. Caution should be taken in handling carbon bisulphide to keep fire away from it as the gas is inflammable.

REFERENCES: Brooks' Bulletin No. 128 of West Virginia Agricultural Experiment Station is the only publication on nut weevils available. Two pages are given to a general discussion of *obtusus* and only a few brief notes on its life history.

Chittenden in United States Department of Agriculture Cir. 99 devotes but half a page to *obtusus*, while Felt and Osborn simply refer to Brooks.

BROOKS, F. E., Bull. 128, West Virginia Agr. Exp. Sta., 1910.
CHITTENDEN, F. H., Cir. 99, U.S. Dept. Agric., 1908.
FELT, E., Manual Trees and Shrubs, p. 218, 1924.
OSBORN, Agriculture Ent., p. 198, 1916.
BLANCHARD, Brooklyn Ent. Soc., Vol. vii, p. 107, 1884 (description only).

MOSQUITO CONTROL AT OTTAWA, ONTARIO

C. R. TWINN, ENTOMOLOGICAL BRANCH, OTTAWA

INTRODUCTION

Ottawa, in common with many other Canadian cities, is subject to an annual outbreak of mosquitos varying in severity from year to year. The season during which these pests are troublesome is usually confined to the spring and early summer but it may extend, as it did during 1926, into August.

Although mosquitoes are the cause of serious discomfort, particularly to people living in the outlying sections of the city, and in the surrounding towns and villages, and one hears complaints of their bloodthirsty habits on every hand, until recently little or no organized effort has been directed to reduce their numbers in the past. This lethargy on the part of the public is possibly due to lack of knowledge of the life-history and habits of our Canadian mosquitoes and of their susceptibility to easy destruction while in the larval and pupal stages.

Without such knowledge the public is apt to regard the seasonal prevalence of mosquitoes as inevitable, and, with the exception of certain expensive and rather futile measures directed against the adults, to leave their control to natural agencies. Faunal and biological studies of the mosquitoes in the Ottawa district carried out during the past three years have revealed the feasibility of largely ridding this locality of the mosquito nuisance. If only a small proportion of the money annually spent by the public in purchasing anti-mosquito dopes and sprays, and wire screening for verandahs, doors and windows, chiefly to exclude mosquitoes, were devoted to the application of organized scientific control measures, this objective would be attained.

During the past year or two, the Dominion Entomologist, in co-operation with the City Health Department, has directed the attention of the people of Ottawa to the possibility and desirability of controlling the local mosquito pests. Rockcliffe village, a residential section lying to the north of Ottawa and immediately adjacent to it, was the first to seek the advisory and supervisory assistance of the Entomological Branch, and a small sum of money to carry out anti-mosquito work was voted by the council in 1925, and again in 1926. The city of Ottawa applied for such assistance early in 1926, and voted a sufficient sum to conduct preliminary control measures.

The Troublesome Mosquitoes and Their Breeding Areas

Before discussing the actual control work it will be in order to give a brie general account of the troublesome mosquitoes, and their principal breeding places. A short account of the latter, together with a fairly complete list of the mosquito species occurring in the district has already been published,[3] and unnecessary reiteration will be avoided as far as is consistent with the proper presentation of this paper.

The species of importance in the Ottawa district (and probably, with few exceptions, throughout Eastern Canada) on account of their abundance and the blood-sucking habits of the adult females, nearly all belong to the genus *Aedes*. These mosquitoes, of which there are several species, develop in temporary bodies of water in the spring and early summer, after having passed the winter in the egg stage, low temperatures apparently being a necessary preliminary to the successfnl hatching of the eggs. The newly hatched larvae begin to appear shortly after the spring thaw sets in and while the water is only a few degrees above freezing point. The bodies of water in which they develop are of two principal types, i.e., flood waters formed by river freshets, and snow and rain pools.

The principal flood-water breeding areas, affecting Ottawa, lie to the north and north-northeast of the city, along the Quebec shore of the Ottawa river, in the vicinity of Leamy creek and Gatineau Point; on Kettle island and west of East Templeton, extending over several hundred acres of land, the extent and severity of the flooding varying greatly from year to year. Lesser areas, of comparatively minor importance from the point of view of mosquito production, are formed by the Rideau river in Ottawa South and Ottawa East.

The snow and rain pools are scattered about chiefly in outlying sections of the city, and outside the city limits. The more important occur in rather low scrubby bushland, but some are found in open fields, although usually not far from trees.

Control Work in 1925.—The control work carried out by the Rockcliffe authorities in 1925, was directed solely against mosquitoes which were developing in great numbers in snow and rain pools situated in several acres of scrubby woodland, in the immediate vicinity of the village. It was undertaken at a fortunate time, however, for, thanks to a scant winter snowfall followed by a comparatively dry spring, few mosquitoes developed in the flood-water areas, a short distance to the north on the opposite shore of the Ottawa river, and consequently few migrated into the treated section. The material used for this and subsequent control work in the district, consisted of a mixture of 70 per cent. heavy and 30 per cent. light petroleum fuel oils, specially prepared for the purpose by a commercial oil company.

On May 14th, the oil was sprayed on the infested pools by means of garden watering cans and a five-gallon knapsack sprayer, at which time the majority of the mosquitoes were in the full-grown larval and pupal stages. Only eighty gallons of oil were used, but the work was done under close supervision, and proved very satisfactory, nearly 100 per cent. mortality occurring in treated pools. Owing to this work, and the absence of migratory species, Rockcliffe and adjacent sections enjoyed greater freedom from mosquitoes than for many years.

Control Work in 1926. In 1926, Ottawa and Rockcliffe set aside further appropriations to allow of the treatment of mosquito pools and flood-water areas south of the Ottawa river within a short distance of the city limits. At

the inception of this work, it was found that the oil supplied was not nearly so satisfactory as that obtained formerly. When sprayed on water it spread very slowly and collected on the surface in dark patches and globules, and had a tendency to drift to the edges of the pools and there adhere to vegetation.

It was at first thought that this was due to the rather low temperature of the water, and to a too high percentage of heavy oil, but experiments soon dispelled this theory. The oil company secures the oil from several different sources and it is possible that the base of the oil, whether asphalt or paraffin, has a definite bearing on its suitability for anti-mosquito work.

At the suggestion of the Dominion Entomologist, the co-operation of the Division of Chemistry, Central Experimental Farm, was secured. After a series of experiments, Mr. F. A. Herman, of the Division of Chemistry, found that the addition of .004 per cent. of sodium or potassium hydrate to the oil, reduced its surface tension, causing it to spread rapidly and evenly when sprayed on water. For practical purposes three-quarters of an ounce of a 50 per cent. solution of caustic soda in water was added to each gallon of oil, the addition being made in the field, as the oil was poured into the watering cans. In order to keep the caustic in suspension it was necessary for the oilers to constantly agitate the oil by means of sticks, while pouring it on the infested pools. This method proved quite satisfactory, although knapsack sprayers had to be dispensed with owing to the caustic solution collecting at the bottom and being pumped off first. The oil film remained on treated waters for at least seven days, in spite of heavy rains, and completely destroyed all mosquito stages present.

The control work in Ottawa was carried out under the immediate supervision of Dr. T. A. Lomer, City Health Officer, by four men and a foreman equipped with a large motor truck to convey the oil to and from the widely scattered breeding areas. The work was commenced on May 15th and completed on May 27th. The oiling was completely successful wherever applied, and resulted in a large section of Ottawa enjoying comparative freedom from mosquitoes throughout the summer. It also served to demonstrate the great importance of the flood-water breeding areas in the Gatineau Point—Kettle island section, to the north of the city, and to emphasize the need of including them in any comprehensive control scheme. In these areas the predominant mosquito is *Aedes hirsuteron* Theo., a small flood-water species with very bloodthirsty habits which, in years of high river freshet, develops in great numbers and invades Ottawa and adjacent localities.

Flood-Water Mosquitoes

In 1926, the Ottawa river freshet* commenced towards the end of April, the rapidly rising water extensively flooding low-lying land on Kettle island and the Quebec shore. The water continued to rise until the end of May, submerging extensive egg-beds of *Aedes hirsuteron* Theo., which had largely remained dry during the previous summer. Within a week or two, the tree lined pools and shallow miniature lakes, formed by the encroaching river waters, were literally swarming with the larvae of this species and, at the beginning of June, the adults were emerging in immense numbers. On June 6th, I visited Kettle island and, on landing on a cleared section of the island, more or less free from trees, I was greeted by large gyrating swarms of *Aedes hirsuteron*

*Data on river levels was kindly supplied by Mr. C. R. Coutlee, Engineer's Branch, Department of Public Works, Ottawa.

that attacked so viciously, in spite of the bright sunlight and a fresh breeze, that it was impossible to remain on the island for more than a few minutes, and I was forced to make a hasty retreat. At this date great numbers had already crossed the Ottawa river and were becoming extremely troublesome throughout Rockcliffe, New Edinburgh and Eastview. A few days later they were beginning to appear in northern sections of Ottawa, and by the middle of June many had penetrated into central sections of the city, more than three miles south of their breeding places, and were causing much discomfort. This species continued to be troublesome until well on into midsummer and, in the neighbourhood of its breeding grounds, persisted until late in August.

Important Points in Oiling

Before discussing other methods and factors in mosquito control it would be as well to make a brief statement of the more important points to be considered in the use of oil against mosquitoes.

Petroleum oils have been used extensively in anti-mosquito work during recent years, but as they vary considerably in their suitability for this work, tests should be made to ensure that the available supply is satisfactory, some time before it is required for use. The oil should spread quickly when in contact with water, forming a thin unbroken film over the surface, without collecting in dark patches or adhering too readily to grasses and foliage. Oil that is too heavy has a tendency to clog portable hand spraying apparatus, and oil that does not spread rapidly is apt to be used in much larger quantity than is actually necessary.

All pools and other collections of water believed to contain mosquito larvae and pupae should be examined prior to treatment, as many likely-looking bodies of water are often uninfested. This may be done by means of a small-mesh strainer such as a coffee strainer which after being passed through the water, may be placed in a white saucer containing water, any mosquito stages present immediately becoming visible. Frequently they are so numerous that they may be easily seen without resorting to this expedient.

The oiling should be delayed until the majority of the larvae are nearly full-grown and some are commencing to pupate. By this time the weather is becoming warmer with the result that the oil spreads more readily. Another reason is that the pupae die more readily than the larvae, and, in addition, any larvae that may have hatched recently are also killed. The work should be carried out under the constant direction of a competent supervisor. The average labourer and gang foreman cannot be expected to perform the work in a satisfactory manner if left to his own resources.

The oiling may be done by means of garden watering cans or knapsack sprayers. If the oil is satisfactory the latter are preferable as they are less wasteful and the spray can be controlled more readily. Particular attention should be paid to the edges of infested bodies of water as it is there that the larvae are often most numerous. Pools lying in exposed situations, such as open fields, should not be sprayed in windy weather, as the wind blows the oil film off the surface into the grass-grown margins. The oilers should be equipped with rubber hip boots and overalls, preferably oilskins.

The Use of Derris in Mosquito Control

The recent paper on the insecticidal properties and uses of derris by Messrs. Kelsall, Spittall, Gorham and Walker[1] led the author to consider the possible

use of this material in some form or other as a substitute for oil in the control of mosquitoes. At the suggestion of Mr. F. A. Herman, and with his co-operation, the derris was tried in powder form, a series of experiments being conducted on mosquito larvae and pupae in the laboratory. The derris was dusted on the water surface at the rate of approximately three pounds per acre, the larvae dying within a period varying from three-quarters of an hour to more than seven hours. In all cases, the larvae, before death, became very feeble, lying motionless and parallel with the surface of the water, moving with difficulty only when rudely disturbed. The pupae died more slowly than the larvae, more than twenty-four hours sometimes elapsing before death occurred.

These experiments served to indicate the possible value of derris, but unfortunately none of the material was available in Ottawa, for field tests, until after the majority of mosquitoes had emerged.

While in Montreal, however, in July, Mr. W. St. G. Ryan pointed out to me a small temporary pool, on the outskirts of a wood, which contained large numbers of larvae of *Aedes vexans* Mgn. The pool was rather more than 200 square feet in area and shallow, with a grass-grown bottom. A mixture of derris and French chalk in the proportion of one part of the former to four of the latter was dusted just before sundown on the surface of the water by means of a small hand dust gun, at the rate of 1½ lbs. of derris to the acre. The material settled well, forming a very satisfactory film of dust over the entire surface. When examined 16 hours later, a considerable proportion of the larvae were dead and many of the living revealed the effects of the derris in their sluggish movements. For certain reasons the pool was not examined again until sixty hours after treatment. On this occasion all the larvae were dead, many floating on the surface of the water.

If in further experimental work derris continues to prove efficient in mosquito control, and if an adequate supply at a reasonable price can be assured, it should be an excellent substitute for oil. Used in dust form with a suitable "filler" it should be possible to treat large breeding areas either with hand-dusters or by aeroplane, the latter working at a remarkably high speed and low cost. In the United States, aeroplane dusting[2] with Paris green, in the control of anopheline mosquitoes, cost only from fifty to sixty cents per acre, and more than two thousand acres were treated per day. Paris green, however, according to investigators in the United States is only effective against the larvae of *Anopheles* which are surface feeders, and does not effect culicine larvae.

Permanent Control Measures

In addition to temporary control measures such as have been already described, much work of a more permanent nature could be carried out in the Ottawa district. Many of the breeding areas, particularly the snow and rain pools, could be permanently removed by properly executed drainage schemes. In many places all that is needed is a few well cut ditches kept in good repair. Other areas could be filled in with such material as city garbage, a measure which has been already started in at least two locations. Finally, the flood-water breeding areas adjacent to the Ottawa and Rideau rivers probably could be greatly lessened by the construction of dykes at strategic points.

Natural Control

Natural agencies, particularly the weather, play an important part in regulating the abundance of mosquitoes. It has been already stated that the

height and duration of the Ottawa river freshet is a deciding factor in the production of flood-water mosquitoes at Ottawa. The freshet, in turn, is regulated by the amount of winter snow fall, spring rains and by temperature. Dry weather in spring frequently results in the extensive drying up of breeding pools, causing the death of great numbers of larvae and pupae. After a short dry spell it is a common sight to see shrunken pools in which the water is literally choked with "wrigglers."

Whenever fish gain access to infested bodies of water, the mosquitoes quickly disappear. In 1926, the Rideau river rose exceptionally high, and in one location certain troublesome mosquito breeding pools remained connected with the river for some time, with the result that they became impregnated with many small fish. No mosquitoes developed in these pools, thanks to the fish, but as the river subsided, the pools dried up and the fish died also.

The larvae of a species of non-biting mosquito, *Corethra cinctipes* Coq., which often occurs in large numbers in temporary bodies of water containing *Aedes* larvae, attack the latter, particularly the smaller, recently hatched ones. Water-beetle larvae are also well-known enemies of mosquitoes and undoubtedly greatly reduce their numbers.

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PARADICHLOROBENZENE AS A CONTROL FOR THE MUSHROOM MITE

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While on my holidays in early July, I received a letter from Mr. Carl Peterson of Port Dover stating that his mushroom bed was being severely injured by a tiny mite. A sample of the soil accompanied the letter. On examination I could easily see a tiny white mite, and though I had nothing with me to make sure of its identity, yet from the general appearance and the description of the injury I feel that there is no doubt it was the mushroom mite, *Tyroglyphus lintneri* Osb.

Mr. Peterson, who is a bright young Danish floriculturist, had already tried but without success to control the mite by using calcium cyanide, nicotine liquid, nicotine powder, X L all nicotine, tobacco stems, carbon bisulphide and ammonia respectively. His failure was to be expected because the mite is notoriously hard to combat. Popenoe, in United States Farmers' Bulletin 789, says, "Little can be recommended for the control of the mushroom mite after it has once become established in a house."

Some months previous to receiving this letter I had been sent samples of wheat severely infested with a closely allied mite, *Tyroglyphus farinae* DeGeer, and by experiment had found that a small amount of paradichlorobenzene quickly killed it. Accordingly I sent Mr. Peterson two pounds of this substance and asked him to try it, but warned him to test it first very carefully on a small area for fear it would injure the mushrooms or the mycelium in the soil. Three

weeks later he wrote stating that the poison had been a complete success and had done no injury. The following is his account of the experiment:

"*Treatment 1.*—Strips of paper about 8 inches wide by 1 yard long were placed on the beds in long continuous rows with about 1 yard distance between rows, with paradichlorobenzene crystals scattered on paper in quantities of about 1 lb. to 400 sq. ft. of beds, after which the beds were covered with newspaper. The beds at time of this treatment had even moisture. Sixty per cent. kill of mites.

"*Treatment 2.*—The beds were thoroughly dried out and the crystals scattered evenly on entire surface of bed. (No care used to avoid scattering on mushrooms.) We used for this treatment in quantities of 1½ lbs. to 400 sq. ft. of bed, after which the surface was damped slightly with a fine syringe. No covering used on beds, but entire mushroom house closed tightly for 48 hours, and then given a good airing for a few hours. This treatment was practically a 100 per cent. kill and as far as we can ascertain with not the slightest harm done to mushrooms. We have used this treatment twice in ten days, the second time to get any mites that may possibly have escaped or hatched since first and second treatment.

"You will understand this is encouraging, more so because our mushroom house is an old barn converted, where planks and old boards are used aplenty. The bed referred to covers the entire bottom of house, about 400 sq. ft., which of course would make it more difficult to clean up."

Four weeks later I called on Mr. Peterson at Port Dover and asked him whether any injurious results had shown up in the meantime from the use of the paradichlorobenzene. He assured me he could see no injury and that no mites had since appeared. As a proof of his confidence in the value of the paradichlorobenzene he had purchased five pounds to keep on hand in case of future need.

On November 1st I again wrote Mr. Peterson and asked him whether any injurious effects from the paradichlorobenzene had since been noticed. He replied November 4th as follows:—

"I can confidently say that to the best of my knowledge the paradichlorobenzene has not caused any injury whatever to the beds, spawn or mushrooms, if used in the quantities mentioned in my previous letter."

I have not had an opportunity to test this control myself, but it looks as though we have in it a promising means of control for the mushroom mite. Further work is of course necessary to test whether it is safe under all conditions; what is the best amount to use and how it may best be applied. I hope that Mr. Peterson's success will not cause other mushroom growers to use it recklessly as they would a well-tested remedy, but that they will try it out first on a small area before treating the whole bed. It seems to me that perhaps a wise method to follow would be to cover a portion of the bed with cheesecloth or burlap or some other material of loose texture, then spread the substance over it at the rate of about 1½ pounds to 400 square feet and leave this on for two days and at the end of that time remove the covering, taking with it any of the crystals which had not evaporated. Then if the mites have been killed and if after a couple of days no damage is seen, the whole bed could be treated in the same manner. Of course, if the crystals can be scattered over the bed itself without any cheesecloth or other intervening substance and this does not injure the plants, it would be a great saving of labour. It must be kept in mind that paradichlorobenzene is quite injurious to many kinds of plants, especially when the crystals come in direct contact with them.

NOTES UPON THE INSECT PREPARATIONS USED IN CLASS WORK AT THE OKA INSTITUTE OF AGRICULTURE

Rev. Father Leopold, La Trappe, Que.

(Father Leopold, recognizing that there would be a group of student members and visitors present at the annual meetings, felt that some idea of the prepared entomological material being used in class work at Oka would be of particular interest to them. Instead, therefore, of the presidential address as announced on the programme, an excellent collection of microscope slides representative of the mounted material referred to was shown to the meeting. The series embraced prepared material illustrating external and internal anatomy, isolated structures and insects mounted entire. Some of the mountings of large insects were particularly striking. All the material indicated clearly the great value of such preparation and its undoubted advantage in use in class work. The demonstration was followed by a descriptive discussion of methods of preparation by Father Leopold, as follows:—)

The insects, after killing, are put into a ten per cent. solution of potassium or sodium hydroxide, kept at room temperature or in an incubator at from 37 degrees to 50 degrees Centigrade. Though this is the oldest and best known method of removing the soft internal part of the insect and of softening the chitin, it has the disadvantage of also frequently removing such essential structures as hairs and scale. Owing to this difficulty I prefer to use the low temperature and to avoid the use of the Bunsen burner. If, however, rapid work is essential, then warm the solution in the hot water bath for but ten or fifteen minutes.

If the chitin becomes excessively clear by the hydroxide it can be coloured by a solution of pyrogallic acid, alcohol and glycerine, and if overcoloured can be bleached by washing in a weak solution of hydrochloric acid.

After these structures have been suitably softened and cleared of soft material the specimen is washed in acidulated distilled water and later in pure distilled water to remove the hydroxide. The water is removed by immersion in increasingly strong alcohol solutions and finally for short periods in absolute alcohol, clove oil, xylol in succession and mounted in Canada balsam.

In the preparation of dried material the insect can be softened by immersion in a dilute solution of the hydroxide or by soaking in 50 per cent. acetic acid, though I prefer the method of R. du Moyer. In this method the insect is soaked in a 10 per cent. solution of ammonia until it retakes the original shape. The material is then washed and carried forward to mounting in the usual way.

An even more convenient method (chloral-phenol method), one invented by J. Armann for botanical preparations, may be applied to arthropods in general. Either one of two formulae may be used—(1) chloral hydrate (crystals), two parts, with phenol (crystals), one part; or (2) equal parts of chloral hydrate and *monochlorophenol (para)*. In either case the mixture is liquefied over a slow heat and kept for use in a stoppered rubber pipette bottle.

Both liquids are miscible alike in water or Canada balsam without opacity or precipitate, and thus allow mounting direct from the macerating fluid. Care should be taken, however, not to expose small structures to the mixture for too long a time as they become very soft and the parts may become dissociated.

Colourless or transparent chitin can be stained to aid in study by being held in a 1 per cent. solution of pyrogallic acid in distilled water for about thirty minutes. Upon removal the material should be exposed to sunlight in 70 per

cent. alcohol or glycerine for a few hours, depending upon the intensity and colour required. If the colour is too intense, bleaching can be effected by immersion in weak hydrochloric acid till sufficiently decolourized when, after washing, dehydration and clearing, the material can be mounted.

THE ACTIVITIES OF THE DIVISION OF FOREIGN PESTS SUPPRESSION

L. S. McLaine, Entomological Branch, Ottawa

The activities of the Division of Foreign Pests Suppression are divided into two main classes or groups: first, the inspection of imported and exported plants and plant products, including the work involved under the Destructive Insect and Pest Advisory Act Board; and second, the handling of field projects in connection with the suppression or control of foreign pests recently introduced and which have not yet secured a foothold in the Dominion.

Inspection of Plants and Plant Products

All importers of plants from any country are required to secure a permit to cover their importation and which must be presented to the Customs before the shipment can be released. For the year ending March 31st, 1926, a total of 13,730 permits were issued to 6,354 different consignees. Shipments of plants arriving from countries other than the United States of America are subject to reinspection on arrival in Canada either at the seaboard or at destination. During the period mentioned above 30,463,000 plants were examined; these arrived in 22,466 packages and involved 5,555 separate inspections. In 199 shipments, pests or diseases of one kind or another were intercepted. Provision was made two years ago for the handling and inspection of small shipments of plants which arrived by parcel post. These packages are examined either at Montreal or Vancouver. This branch of the work is increasing very rapidly; last season 1,005 packages containing 94,082 plants were inspected at Montreal.

In addition to the inspection of nursery stock, an effort is made to inspect shipments of plant products of all kinds and descriptions entering Canada from foreign countries. This work can only be carried on at ports where inspectors are stationed, and on account of the limited staff, inspections of these products can only be made at times, when the inspectors are free from examining imported nursery stock. A total of 5,692 inspections were made of plant products in 1,049,833 containers. In 83 inspections pests or diseases were intercepted.

It has been realized for some time that, in addition to the danger of importing noxious pests and diseases on shipments of nursery stock and plant products brought in by the regular channels, the question of immigrants and passengers bringing in plants would have to receive consideration. Passenger boats have been attended at the ports of St. John, Quebec, Montreal and Vancouver. At the first three ports inspectors were on hand on the arrival of 318 boats; on 128 boats passengers to the number of 208 were found to be bringing plants with them. If the plants in question were not prohibited entry for one reason or another, they were examined by the inspector and, if free from pests or diseases, were returned to the passenger.

Certain species of plants are prohibited entry into Canada on account of specific pests or diseases; during the past fiscal year 13,490 plants and 19 shipments of potatoes were either seized by the inspectors or refused entry.

During the past few years there has been a very marked increase in the amount of plant materials exported to foreign countries. Last season 326 inspections for export shipments were made, the plants being consigned to nineteen different foreign countries. The products certified included 283,676 plants, 103,766 bulbs, 4,430 pounds of forest tree seed, 25,000 pounds of onion sets, also tobacco plants, tomato plants, etc.

Towards the end of the winter a fumigation and inspection building was constructed at the port of Montreal. This station is 150 feet long by 50 feet in depth. It contains three large fumigation and inspection rooms, a small cyanide chamber, a research laboratory, a large room for the installation of vacuum fumigation apparatus, and a boiler room. When the fumigating apparatus is installed, it is to be hoped that the station will be one of the best equipped of its kind, and will fill a much needed want.

Field Projects

Brown-Tail Moth.—This insect, which was present in large numbers in the provinces of Nova Scotia and New Brunswick during the period 1910 to 1917, has gradually been brought under control. During the winter of 1913-1914 over 25,000 winter nests were collected in Nova Scotia and over 28,000 in New Brunswick. These numbers have been greatly reduced, in New Brunswick no nests having been found since the winter of 1917-1918. During the past season ninety-five nests were collected in Nova Scotia. There are several points in the latter province where breeding is going on, but these are kept under close observation, the worst orchards are sprayed and it is to be hoped that the insect will eventually be exterminated.

Apple Sucker.—This insect was first found in the vicinity of Wolfville, Nova Scotia, in the summer of 1919. It has now spread over the main apple growing sections of that province and into two adjacent counties in New Brunswick. It is a pest that is more or less readily controlled under orchard conditions, but no effective ovicide has yet been found. Consequently there is an embargo on the movement of the host plants of this insect from the infested to non-infested territory. Scouting work carried on this past season indicated that there had been but little spread during the year.

Gypsy Moth.—This pest was discovered in the vicinity of Henrysburg, Quebec, in the late summer of 1924. The infestation covered about one-third of a square mile and 2,845 egg clusters were treated. Extensive control measures have been carried on each year, consisting of the spraying of all foliage, creosoting of egg clusters, burning stone walls and brush likely to harbour young caterpillars, and the placing of burlap and tanglefoot bands on the trees in the infested area, with the result that only one old egg cluster was found this fall. In addition, scouting is being carried on in southern Quebec from the Ontario to the New Hampshire line. This work is being carried on co-operatively with the Quebec Department of Lands and Forests.

European Corn Borer.—During the past summer this insect was found to have spread into sixty additional townships in Ontario and had also invaded the province of Quebec at two different points. With the exception of the outbreak at North Bay, Ontario, the increase in distribution has been due undoubtedly to natural spread. A marked increase in the intensity of infestation was also noted, especially as regards southwestern Ontario.

Mexican Bean Beetle.—This insect, a native of the southwest United States, was found in Alabama in 1920. In one year it spread 4,500 square miles and by 1924 was found on the southern shore of Lake Erie. Scouting to determine whether the pest had invaded Ontario was carried on in 1925 and 1926. Up to the present time no sign of the insect has been found. It is a serious pest of many varieties of bean.

European Pine Shoot Moth.—In the late spring of 1925, a small shipment of pines imported from Europe were found infested with this insect; the shipment was destroyed. Later in the season a report from the Toronto district indicated the presence of the pest, scouting was immediately started and the pine shoot moth was found at several points in this area. In the fall, plans were formulated to re-examine all pines imported since the inauguration of the permit system. This work was started in the spring of 1926, with the result that infestations were found at forty-five points in Ontario, and one in British Columbia. An endeavour has been made to clean up each infestation, and the work will be continued in 1927. The pest is established in at least fifteen states of the United States.

European Corn Borer Parasites.—In 1923 a parasite laboratory was established at St. Thomas, Ontario, for the purpose of rearing and colonizing parasites of the European corn borer. The original breeding material was furnished by the United States Bureau of Entomology. Owing to the severity of the corn borer outbreak in the southwest portion of the province, the laboratory was moved to Chatham in 1925. During the four years the laboratory has been in operation 2,577,000 *Habrobracon brevicornis* and 118,600 *Exeristes roborator* parasites have been liberated. This past summer two new species, an *Apanteles* sp. and a *Microgaster* sp. have been secured and this new material is now being bred.

SOME PRELIMINARY OBSERVATIONS ON THE LIFE HISTORY OF THE ARMYWORM, *CIRPHIS UNIPUNCTA*, HAW.*

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This paper covers some phases of the life history of the armyworm, *Cirphis unipuncta*, which have been under study at the Dominion Entomological Laboratory, Strathroy, Ontario, during the years 1925 and 1926.

From an economic standpoint, little or nothing has been seen or heard of this insect in Ontario since the memorable outbreak of 1914. At that time the losses to grain crops and pasture fields were estimated to be a quarter of a million dollars in Western Ontario alone, to say nothing of the damage caused in Eastern Ontario, and other parts of the Dominion. It would appear from authentic Canadian records that outbreaks of this insect occur at irregular periods of from fourteen to twenty years, depending possibly upon weather conditions and the presence or absence of parasites and predators.

In normal years the armyworm is difficult to find, and the present investigation has shown that a knowledge of the insect, especially in the earlier instars, is necessary before field observations can be made with profit.

The results of the study in 1925 were negligible. Sugar baiting at night for the moths was started early in the spring, and a worn moth was secured on May 18th. This is very early, and is felt to be an unusual record. No other moths were taken until June 3rd, though the small flight lasted until June 29th. A total of twenty-five moths was secured during the first flight.

Moths were seen again on the wing on July 23rd, and were taken in small numbers until August 13th. During the latter period fourteen moths were secured. Search made in likely situations failed to reveal any larvae and the opinion was felt to be justified that armyworms were very scarce.

In 1926 the same ground was covered, and the spring flight of moths was fairly strong. In 1926 the area of sugaring was slightly enlarged so as to be sure of an ample supply of moths. Moths appeared on the wing on June 17th, and the flight lasted until July 19th, the peak of flight being on June 22nd and 23rd. The spring flight lasted forty-two days, and a total of 192 moths were collected. For rearing, these moths were introduced in to a field cage and the cage results checked by insectary studies.

Oviposition.—On June 3rd, fourty-four moths were collected from sugared baits placed upon fence posts along the road. The sexes were not determined at the time, but were placed four to a bag in 16-pound paper bags containing a small bunch of couch grass (*Agropyron repens*) with a piece of absorbent cotton saturated with dilute blackstrap molasses. An examination of the bags after death of the moths showed that three of the bag cages contained male moths only. Of the other cages each contained three males and one female, and seven females of eight under observation laid fertile eggs. These eggs varied in number per female from 8 to 661; a total of 1,127 eggs were secured with a fertility of 97.97 per cent. and a viability in fertile eggs of 82.57 per cent. No doubt all the fertile eggs would have hatched had humidity conditions been properly regulated, as all eggs showed development. From a study of 801 eggs, the duration of the egg stage was found to vary from four to five days. In bag cages the females have pre-oviposition period of at least ten days, and the possibility is that it may be longer. In the same cages, with only couch grass present, the eggs are usually thrust in between the folded sides of a blade and glued along the grooves with a sticky fluid, the sides of the blade being drawn together so as to hide them effectually. In a study of 1,127 eggs in bag cages with couch grass present, 83.85 per cent. were found in the folded leaf blades, 4.04 per cent. on unfolded leaf blades, and 2.10 per cent. between the leaf sheath and the stem.

Development.—Armyworm larvae pass through six instars. The rate of development may be accelerated by the quantity and nature of food supplied. For instance, those which were fed exclusively on corn leaves matured in forty-one days; with larvae fed upon timothy only the stage was prolonged from forty-eight to fifty days; on oats the period of development was from forty-seven to fifty-three days; and on barley part time the period ranged from forty-seven to fifty-one days. The barley in the latter experiments became too ripe by July 22 and corn leaves were substituted.

When mature the larvae pupate just below the surface at an average depth of half an inch. In a large field cage no pupae were taken below this depth; from this cage 435 male and 611 female pupae were recovered. This number would have been much larger had the wire mesh been fine enough to confine all of the larvae, as during the early instars a number migrated from the cage.

The day after emergence, single pairs of moths, from insectary reared material, were placed in the paper bag cages with grass and molasses, to ascertain the length of adult life, also incidentally to determine whether oviposition would take place under such conditions. A total of twenty-two bags were used. The maximum adult life of male moths was found to be thirty-seven days and the minimum twenty-two days; the maximum adult life of female moths was fifty days and the minimum thirty-two days.

From this material mated only four out of twenty moths oviposited. They laid 120, 75, 429 and 150 eggs, respectively. All eggs proved infertile. Flight seems to be a necessary requisite to successful mating and oviposition. This appears to be proven by the fact that moths taken during flight oviposited freely in paper bags. All the eggs proved fertile, while those placed in bags the day after emergence oviposited sparingly and all eggs thus secured were infertile.

Fall Flight of Moths.—From insectary reared material, moths appeared in the breeding cages on August 15th, exactly one week earlier than those appearing in the field. The fall flight lasted forty-four days, but was not as heavy as that of the spring. In the field, moths first appeared upon sugar-baited posts on August 22nd, and were on the wing until October 4th, the peak of flight being September 5th. A total of 184 moths were secured. Field and insectary cage studies were made with the fall brood and it would appear that the larval stadia, as far as reared in the fall, are slightly longer than those in the spring. The studies are still in progress, and such results are not incorporated in this paper.

THE SPREAD AND DEGREE OF INFESTATION OF THE EUROPEAN CORN BORER IN CANADA, 1926

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During the past several meetings of this Society a record of the comparative importance of the European corn borer from year to year has been presented, and each season our report has indicated further spread and more intense infestation. It is regretted that the 1926 statement is no exception and that the corn borer has not only spread over a much larger area than normally, but has increased alarmingly in the important corn growing counties where it has been established for a few years.

Although it is believed that this pest became established in Elgin county in 1910, it was not discovered until 1920, when nearly three thousand square miles were found infested. Since then it has spread rapidly and at the end of the 1925 season had covered all territory south and west of Simcoe and York counties inclusive, as well as all shore townships along the north shore of Lake Ontario and the St. Lawrence River as far east as Brockville, in Leeds county.

This year the scouting has revealed an unexpected spread to new territory with the result that practically all corn growing areas in the province of Ontario are now infested. One or more collections were taken in sixty *new* townships in this province as follows: 2 in Durham county, 2 in Victoria, 3 in Peterborough, 5 in Northumberland, 4 in Hastings, 3 in Lennox and Addington, 10 in Frontenac, 6 in Leeds, 3 in Grenville, 3 in Dundas, 1 in Stormont, 1 in Glengarry, 2 in Prescott, 2 in Russell, 5 in Carleton, 4 in Lanark, 3 in Renfrew, and one collection in the township of Widdifield, Nipissing County, in the vicinity of North Bay.

The above does not represent the full results of the 1926 scouting season. The province of Quebec is now interested in the corn borer situation, as several collections were taken within that province, including three townships in Hull county (north of Ottawa), seven points in the counties of Chateauguay and Huntingdon, and at one point in Lacolle township, St. John's county. The Hull county infestation is undoubtedly due to the general spread which occurred

throughout eastern Ontario, but as the corn borer was found in the vicinity of both Albany and Buffalo in 1919, and the 1926 scouting shows that north-eastern New York state is now infested, it is probable that the infestations in southern Quebec are also due to natural spread.

Degree of Infestation in Infested Territory

During the past three years records of the degree of infestation have been taken at many points within the more important corn-growing districts. This work was continued in 1926, but several points were omitted from the concentric circles radiating from the original centre of the outbreak as well as a few points in other districts, due to the pressure of work and the advisability of extending the observation territory to include the northern shore of Lake Ontario. The following table is a summary of the records procured since the work was started in 1923:

Area	Highest per cent. infestation				Lowest per cent. infestation				Average per cent. infestation				Total number of fields examined			
	1923	1924	1925	1926	1923	1924	1925	1926	1923	1924	1925	1926	1923	1924	1925	1926
Circle No. 1 (6-8 miles)	68.0	99.0	83.0	82.3	4.33	4.6	6.0	7.6	30.16	59.72	40.88	30.7	55	55	40	30
Circle No. 2 (15 miles)	47.0	72.0	77.0	92.0	0.0	3.6	0.3	1.0	16.97	32.52	32.15	39.3	80	80	65	50
Circle No. 3 (30 miles)	7.66	28.3	65.33	91.3	0.0	0.0	0.0	1.6	1.93	7.72	11.09	29.5	135	135	135	75
Brant County				21.3				2.3				10.3				5
Essex County (80-100 miles)	13.66	82.33	100.00	100.00	0.0	0.7	0.0	14.0	1.31	13.53	37.52	83.0	48	85	85	74
Frontenac County				1.0				0.0				0.26				5
Haldimand County		2.6	8.0	8.33		0.01	0.0	1.0		1.14	2.96	3.8		10	10	10
Hastings County				2.0				0.0				0.73				5
Huron County (50-70 miles)	1.4	3.0	9.0	21.0	0.0	0.0	0.66	4.6	0.3	1.36	4.89	11.4	12	10	10	5
Kent County		84.3	100.00	100.00		0.3	4.0	7.0		24.19	52.84	78.7		40	40	25
Lennox and Addington				20				0.0				0.46				5
Lambton		11.3	14.33	79.3		0.1	0.0	5.0		3.21	5.20	34.0		25	25	25
Leeds				1.0				0.0				0.2				5
Lincoln	0.6	1.6	7.33	23.0	0.0	0.0	0.0	0.3	0.2	0.4	1.16	5.3	15	15	15	15
Norfolk East (45 miles)	1.2	4.6	28.0	17.0	0.0	0.9	1.66	0.3	0.32	2.66	9.79	8.53	5	5	5	5
Northumberland				1.66				0.0				0.6				10
Middlesex (Northwest)		13.3	7.66	54.3		0.6	1.66	2.6		6.46	3.59	28.5		10	10	10
Oxford (40-45 miles)	2.8	12.6	13.0	26.6	0.0	0.0	0.0	4.0	0.93	3.61	3.68	13.7	15	15	15	15
Prince Edward				10.3				0.0				1.9				35
Welland (95-115 miles)	4.4	11.0	36.33	64.3	0.0	0.0	0.0	0.6	1.06	2.92	11.56	23.7	45	45	45	45
Wentworth				3.3				0.3				1.87				5

NOTE.—Mileage stated represents the distance from Union Village, the original centre of the infestation. Welland County first found infested in 1920, and apparently a separate outbreak.

A summary of the above shows that the percentage of stalk infestation within Circle No. 1 has decreased in both 1925 and 1926, a reduction of 25 per cent. occurring this year; Circle No. 2 increased by 21 per cent.; Circle No. 3 increased by 166 per cent.; Essex county, 121 per cent.; Haldimand, 28 per cent.; Huron, 133 per cent.; Kent, 50 per cent.; Lambton, 553 per cent.; Lincoln, 357 per cent.; a reduction of 13 per cent. occurred at our only observation point in eastern Norfolk, which is located near Simcoe, although an increase was noted at several other points in the county by other officers; Middlesex (north west) increased 680 per cent., Oxford 272 per cent., and Welland 105 per cent.

These figures indicate a very serious situation and give one an idea of the crop losses which have resulted. The area along the Kent-Essex county line, in which practical destruction of crop extended over 400 square miles in 1925, has increased this year to an area of approximately 1,200 square miles, no part of either Essex or Kent counties being totally free from ruinous infestation in early planted field corn. The area of extensive loss extended westward to the Detroit river and northward into the southern part of Lambton county. The severe infestation in the Kent-Essex territory has resulted in a marked decrease in corn acreage, corn having practically disappeared from the territory most severely infested in 1925. The records show further that the borer is increasing seriously in Welland county, and in so far as the area on the north shore of Lake Ontario is concerned, Prince Edward county would appear to be the only one where serious damage is likely to result within the next few years. The infestation in the latter county, which was not found infested until 1924, averaged about 2 per cent. this year, but fields showing as high as 10 per cent. infestation were encountered.

The corn borer is now distributed over approximately 35,000 square miles in the province of Ontario, excluding the area concerned as a result of the North Bay collection. About 200 square miles in Hull county, Quebec, are infested, and approximately 550 square miles in southwestern Quebec. The most eastern collection taken in Ontario is 375 miles from the original outbreak in Elgin county, and as scouting records indicate that the infestation in the northeastern counties is well established, it may be recorded here that the pest will apparently thrive under conditions occurring approximately 200 miles north of St. Thomas. The collection taken in the North Bay district is probably due to artificial spread, but it represents the most northern record to date, being approximately 250 miles north of St. Thomas, and the progress of the borer in that district will be watched with interest, although the corn crop fluctuates each season in regard to both quantity and growth. The newly infested areas, comprising the counties of Carleton, Russell, Lanark and Renfrew, are rather important in corn growing, especially ensilage, and the development of the pest should be watched there. The majority of the infested territory in southwestern Quebec is also important, as thousands of acres are grown, but silos are used extensively and may assist greatly in delaying serious outbreaks.

THE OCCURRENCE OF THE EUROPEAN CORN BORER IN ONTARIO IN PLANTS OTHER THAN CORN AND ITS SIGNIFICANCE

J. MARSHALL, ONTARIO AGRICULTURAL COLLEGE, GUELPH

In the event of a discontinuance of corn growing in the province of Ontario or in any part of it, will the corn borer be able to exist on other plants and, if so, will it be likely to prove a menace in that way? This question, a pertinent one since the European corn borer first appeared in damaging numbers in Ontario, became of primary importance following the alarming increase of the insect in Kent and Essex counties in 1925.

Previous to this, observations on the occurrence of the borer in other plants than corn had been made from time to time by both federal and provincial investigators. This work, done in Elgin county, it was felt, should be augmented by additional observations in Kent and Essex. Accordingly Professor Caesar detailed the writer to a field investigation in the latter counties. Our observations, made in the months of September, October and November of 1925 and 1926, together with related data obtained by other investigators in Ontario, are briefly presented herein.

A.—ARTIFICIAL INFESTATION

1921. Crawford and Spencer caged various weeds and garden crops after infesting them with slips of corn leaves bearing corn borer eggs. To quote their notes: "We had no success in establishing larvae on weeds, but a few established themselves on mangels, potatoes, celery, cauliflower, peas, beans, pepper, *radish*, *salvia*, and *aster*." I have no information as to the numbers established, or their stages of development when examined.

1922. Crawford and Spencer caged corn borer moths with the following plants: *zinnia*, tomato, tobacco, cosmos, *bachelor's button*, *barnyard grass*, *green foxtail*, *yellow foxtail*, *pigweed*, *ragweed*, *and lamb's quarters*. Although no eggs were laid on any of these plants growing beside an infested corn field, the moths in the cages laid freely on all but tobacco, tomato, and cosmos, and a small percentage of the larvae reached maturity on each of the different plants on which the eggs were laid.

1924. Spencer placed four pairs of moths in each of three cages over weeds, hops, and oats, respectively. Larvae were recovered in various stages of development varying from second to sixth instar in the following weeds: *green foxtail*, *Canada thistle* and *common pigweed*. In these, 15.25 larvae were established per female moth caged. In the *hops* the larval development ranged from first to fourth instar, 18.25 larvae being recovered per female moth. The *oats*, a total of 397 stems showed 215 stems infested. Most of the larvae were second or third instar. They were decidedly more numerous than in either of the other cages but their exact number was not determined.

Summing up the work on artificial infestation, larvae established themselves on the following plants: *mangel*, *potato*, *egg plant*, *celery*, *cauliflower*, *radish*, *pea*, *bean*, *pepper*, *salvia*, *aster*, *zinnia*, *bachelor's button*, *hops*, *oats*, *barnyard grass*, *green foxtail*, *yellow foxtail*, *pigweed*, *ragweed*, *lamb's quarters* and *Canada thistle*.

In the case of the weeds, migration from one species to another has not been taken into consideration. The studies of this phase of the investigation work are incomplete, but they do show that the corn borer, if necessary, and

if it should oviposit on them, can adapt itself to quite a large number of plants besides corn. Our natural infestation records which follow show, however, that only on very rare occasions does oviposition occur on any plant but corn, and in areas of very heavy infestation, on oats and barley.

B.—Natural Infestation

1921. From confidential and published reports of Crawford, Spencer and Painter on the year's work I take the following data: In one field of sweet corn in Elgin county the weeds were so heavily infested as to contain 24,400 larvae per acre. Weeds infested in or adjacent to corn fields were: *orchard grass, wild sunflower, blue weed, goldenrod, mullein, yarrow, tumble weed, red root pigweed, lamb's quarter, yellow foxtail, green foxtail, barnyard grass, old witch grass, lady's thumb, wild buckwheat, Canada thistle, burdock, ground cherry, beggar ticks.* Cultivated plants infested were: *geranium, aster, canna, golden glow, squash vines, garden beats, Hungarian grass, Mann's wonder sorghum,* and *dahlia.* With the exception of dahlias and possibly Mann's wonder sorghum, the infestation of these plants was entirely due to migration of the larvae from corn.

1922. Crawford and Spencer found the following to be additional shelter plants: *wild raspberry, apples* (windfall), *burdock, Canada thistle, white sweet clover* and *sugar beets.*

They found that both oats and sugar beets might serve as host plants. In an oat field previously in corn numerous larvae were taken. Estimates placed their number at 77,645 per acre.

The loss to the grower did not exceed more than one-half bushel of oats per acre. No larvae were past the fifth instar stage when the oats were out, and all that did not reach other plants of suitable nature died within two days.

In a sugar beet field there was a fairly general though slight infestation due to migrating larvae bred in an adjoining cornfield. One beet, however, was found infested with three borers far enough from any other infested plants to indicate its being a host.

Tobacco grown beside corn for two years in succession was found infested.

1923. Curled dock, *hollyhocks, gladiolus* and *rhubarb* were added to the list during this summer.

1925. The investigation in 1925 was carried on within a radius of twenty miles of Tilbury, the scene of ruinous infestation of corn that year. The list of shelter plants was increased by the following: *giant ragweed, curled dock, cocklebur, motherwort, common mustard, garden sunflower, velvet-leaved mallow, smartweed, daisy, fleabane, thorn apple, oak-leaved goosefoot, Soy bean* and *white field bean.*

As many as thirty-three larvae were removed from a single giant ragweed plant growing in a cornfield. All infestation of these plants occurred within migrating distance of a cornfield, and although extensive examinations were made among them in areas removed from such, none were found infested.

Tomatoes were entered where growing beside a cornfield and in a few instances considerable loss of fruits took place.

Special attention was given to sugar beets since it was felt that their high sugar content, making them in this respect akin to corn, might also make them suitable as host plants for the corn borer. Many beet fields were examined and the following table, representing infestation of beets adjoining a ruined cornfield, was typical of the conditions obtaining in the Tilbury district:

Row of Beets	Distance from Corn (feet)	Plants entered per 100
1	4	93
2	6	67
3	8	52
4	10	24
5	12	19
6	14	14
8	18	7
10	22	3
20	40	1 } no borers found.
40	80	1
80	160	1
100	200	occasional

It will be noted that up to a distance of twenty feet from the corn, the infestation steadily decreases as the distance from the corn increases. This clearly indicates the migratory tendencies of the insect.

Entry of beets at 200 feet was so regular, though slight, that migration seemed unlikely at this distance. Eggs were found on beets earlier in the season by both Baird and Ficht, of the Dominion Entomological Branch, so since previous artificial infestation experiments indicated that larvae could develop on sugar beets, it is likely that in this very heavily infested area beets served to a very slight extent as host plants when near corn fields. However, no sugar beets were found infested farther than 250 feet from infested corn.

Dahlias were found by Ficht infested at a distance of 150 feet from growing corn before the time of expected migration. It is entirely probable that this infestation was a result of oviposition on the dahlias.

Reports of corn borers infesting weeds and other plants not in the neighbourhood of corn fields have frequently been received from farmers. In practically all cases the larvae present were not corn borers.

1926. Additional shelter plants discovered in the past season's work were: *potato*, *carrot* (as many as seven larvae in a single root reported by Baird and Thompson from Petite Cote), *sumach* and *pokeweed.*

Infestation of weeds bordering on oat fields was common this year, four borers being taken from one ragweed plant in such a situation. In the weeds surrounding a six-acre oat field previously in corn but unploughed, it was estimated that there were at least 2,400 larvae. It is fortunate that relatively few fields were as poorly tilled as this one because evidence shows that oats following corn in poorly cleaned fields are more subject to infestation than if grown in well ploughed land. Likewise, when the fence-rows are kept free from stout weeds undoubtedly practically all the larvae, even at the edges of the fields, never reach maturity.

An average of two corn borer larvae per square yard in oat fields was reported by Ficht this past summer as common infestation in the Tilbury district.

Some interesting data in regard to host plants were obtained this year. Barley fields in the vicinity of Chatham and Tilbury were infested at the rate of approximately one larva per square yard, according to Ficht. The writer was unable to find any borers in the weeds bordering on barley fields, possibly because the barley was cut and removed before the majority of the larvae were able to migrate to any extent. Barley, of course, matures a week to two weeks before oats.

Two gladioli were found infested by Dustan in the horticultural test gardens at St. Thomas. I understand that members of the Dominion Branch have also found infested gladioli in these gardens. This year, at least, no corn was growing in the immediate vicinity.

Slight infestations of dahlias were found in several localities in Kent county. These were isolated and clearly resulted from oviposition on the dahlias.

Zinnias not in the vicinity of any other infested plants were slightly attacked near Wheatley, five mature and one fourth instar larvae being taken from 100 plants. Like the dahlias, these plants were almost certainly acting as hosts.

Summary of Natural Infestation Records

1. *Host Plants.*—Aside from corn the following have acted as host plants only in scattered instances, with the exception of oats and possibly barley:

1. Corn—Zea mays L.
2. Dahlias—Dahlia sp.
3. Gladioli—Gladiolus sp.
4. Zinnias—Zinnia elegans Jacq.
5. Oats—Avena sativa L.
6. Barley—Hordeum vulgare L.
7. Sugar Beets—Beta vulgaris var.

2. *Shelter Plants Only* (Weeds):

1. Orchard grass—Dactylis glomerata L.
2. Wild Sunflower—Helianthus sp.
3. Blueweed—Echium vulgare L.
4. Mullein—Verbascum thapsus L.
5. Goldenrod—Solidago sp.
6. Yarrow—Achillea millefolium L.
7. Wild raspberry—Rubus strigosus Michx.
8. Canada Thistle—Cirsium arvense (L.) Scop.
9. Burdock—Arctium minus Bernh.
10. Giant Ragweed—Ambrosia trifida L.
11. Common Ragweed—Ambrosia artemisiifolia L.
12. Curled Dock—Rumex crispus L.
13. Tumbleweed—Amaranthus graecizans L.
14. Ground Cherry—Physalis heterophila Nees.
15. Cocklebur—Zanthium echinatum Murr.
16. Motherwort—Leonurus cardiaca L.
17. Bindweed—Polygonum convulvulus L.
18. Lamb's Quarters—Chenopodium album L.
19. Common Mustard—Brassica arvense (L) Kuntz.
20. Beggar's Ticks—Bidens frondosa L.
21. Green Foxtail—Setaria viridis (L) Beauv.
22. Yellow Foxtail—Setaria glauca (L) Beauv.
23. Velvet-leaved Mallow—Abutilon theophrasti Medic.
24. Smartweed—Polygonum persicaria L
25. Daisy Fleabane—Erigeron canadensis L.
26. Thorn Apple—Datura stramonium L.
27. Oak-leaved Goosefoot—Chenopodium glaucum L.
28. Sumach—Rhus typhina L.
29. Pokeweed—Phytolacca decandra L.
30. Barnyard Grass—Echinochloa crusgalli (L) Beauv.

Shelter Plants Only (cultivated):

31. Apples (windfall)—Pyrus malus L.
32. White Sweet Clover—Melilotis alba Desr.
33. Yellow Sweet Clover—Melilotis officinale (L.) Lam.
34. Potato—Solanum tuberosum L.
35. Tomato—Lycopersicon esculentum Mill.
36. Carrot—Daucus carota L.
37. Soy Bean—Glycine hispida Maxim.
38. White Field Bean—Phaseolus vulgaris L.
39. Garden Sunflower—Helianthus annuus L.
40. Geranium—Pelargonium hortorum Bailey.
41. Aster—Callistephus hortensis Cass.
42. Golden Glow—Rudbeckia lacinata L.
43. Squash Vines—Cucurbita maxima Duchesne.
44. Broom Corn—Holcus sorghum Var. techinus L.
45. Sudan Grass—Holcus sudanensis Bailey.
46. Early Amber Sugar Cane—Holcus sorghum Var. saccharastus L.
47. Hungarian Grass—Setaria italica (L) Beaux.

Plants Common in Infested Cornfields but Never Found Attacked:

1. Prickly Lettuce—Lactuca scariola L.
2. Spiny Annual Sow Thistle—Sonchus asper (L.) Hill.
*3. Soft-leaved Annual Sow Thistle—Sonchus oleraceus L.
4. Perennial Sow Thistle—Sonchus arvensis L.
5. Dogbane—Apocynum sp.
6. Milkweed—Asclepias syriaca L.

*One withered plant found infested in late October.

All of these uninfested plants, it will be noted, have milky juices.

Certain inferences may reasonably be drawn from the observations cited.

1. The corn borer in Ontario may, and commonly does, enter any of the fairly stout weeds common in corn fields, with the exception of those with milky juices. Many cultivated plants are also subject to attack when growing beside infested corn. Infestation of the above plants, irrespective of those mentioned below as host plants, occurs in the late summer or autumn after the borers have matured or nearly matured in the corn.

2. Oviposition occurs on both oats and barley, and larvae can survive to at least the fifth instar stage in oats. However, both crops are harvested before the borers reach maturity. In the case of oat infestation the larvae near the borders of the field are likely to enter and develop to maturity in weeds, but if the field has been properly tilled larval survival would be very small, even under conditions of severe infestation.

3. Oviposition in the field rarely occurs on any crops but corn, oats and barley.

4. The corn borer may and occasionally does develop from egg to maturity in dahlias, gladioli, zinnias, and sugar-beets. It commonly develops to at least the fifth instar in oats and possibly in barley. These seven plants constitute to date the known hosts of the European corn borer in Ontario.

In Conclusion

There are no indications that any other Ontario crops will be injured by the corn borer as long as corn is grown on a commercial scale in the Province.

If, as is expected, the early corn acreage in Kent and Essex counties becomes practically nil in 1927, it is difficult to predict what will become of the moths in this area. Many of them, aided by air currents, will almost surely find their way to neighbouring counties where corn is more abundant, but whether or not even late corn will be seriously attacked remains to be seen. Heavy infestation of oats and barley will probably occur in Kent and Essex in 1927.

As to the fate of the corn borer in event of a so-called province-wide abandonment of corn, our findings lead us to believe that the species would still be perpetuated in the aforementioned host plants, or that in the course of time, in view of a consideration of its host plants in its native habitat, that it might gradually adapt itself to still others such as hemp or hops. As long as there is even a little corn grown in the Province, however, we have reason to feel that the borers will concentrate upon it practically to the exclusion of other plants.

THE LARVAL MORTALITY OF THE EUROPEAN CORN BORER IN 1926

JAMES MARSHALL, ONTARIO AGRICULTURAL COLLEGE, GUELPH

In 1924 and 1925, in papers read before the Entomological Society of Ontario, Professor Caesar gave the results of studies of larval mortality. This year the experiments were continued. The methods employed, similar to those of the previous years, were outlined in the Report of the Society for 1924, so need not be given here. The following table gives a summary of the results.

I. TABLE SHOWING THE MORTALITY OF LARVAE FROM EGGS ARTIFICIALLY PLACED ON CORN PLANTS WHICH WERE KEPT FREE FROM ALL OTHER EGGS

Date eggs placed on plants	Number of eggs per series	Date plants dissected and larvae counted	Number of days	Living larvae	Mortality
July 24..........	900	August 6	13	117	87%
July 24..........	900	August 24	31	99	89%
August 5..........	900	August 17	12	122	86.4%
August 5..........	900	September 5	31	144	84%
	3,600			482	86.6%

This year weather conditions had apparently a fairly uniform effect on larval mortality from July 24th to August 5th (eggs being classed as potential larvae).

The table below is prepared to show the comparative mortalities in the years 1924, 1925 and 1926.

II. TABLE SHOWING LARVAL MORTALITIES FOR 1924, 1925 AND 1926

Year	Number of days from time eggs were placed on the plants until plants dissected	Larval mortality for each series	Average larval mortality for the year
1924.............	12 24	76.28% 79.19%	77.73%
1925.............	15 30	93.65% 93.5%	93.58%
1926.............	12.5 31	86.7% 86.5%	86.8%

This table shows that, as has been previously pointed out, larval mortality takes place almost entirely in the first week after the eggs have hatched, or, in other words, in the first and second larval instars.

The above yearly averages may now be compared to the average yearly field infestation as found by the Dominion Entomological Branch within a radius of fifteen miles of Union, Elgin county, where our experiments were conducted.

III. Table Showing Correlation of Larval Mortality and Field Infestation

Year	Average artificial mortality	Average larval survival	Average field infestation Union district
1923	not taken	not taken	23%
1924	77.7%	22.3%	45.5%
1925	93.5%	6.5%	36%
1926	86.6%	13.4%	39%

Admitting that there are factors entering into the artificial work which do not obtain in the field, these are a constant and it will be seen that the records mirror fairly closely the natural infestation. A high mortality in the experiments foretells a decrease in the expected field infestation and *vice versa*. For instance, in 1924 the mortality as found in our experiments was 77.7 per cent. This, as we now know, is for the European corn borer a low larval death rate, so it was not surprising that the field infestation practically doubled that year. Next year the mortality was 93.5 per cent., a high death rate, since only 6.5 larvae survived out of every hundred eggs laid as compared with 22.3 in 1924, or, in other words, about one-quarter as many larvae established themselves. Therefore it was not surprising when, instead of doubling, the infestation in 1925 was reduced one-fifth. This year a mortality of 86.6 per cent. indicates a moderate increase in the field since approximately twice as many larvae survived as in 1925 but only half as many as in 1924. This expected increase is borne out by the infestation records which have just been compiled.

The past year's experiments were conducted at Aylmer, Elgin county, and those of the preceding two years at Union, twelve miles southwest of Aylmer. An egg parasite (*Trichogramma minuta*) produced a distinct though undetermined mortality in 1925, but no parasitism was evident at Aylmer this year.

It might be added that we are experimenting on the factors influencing the mortality of corn borer moths and the number of eggs laid, but as yet we have not done enough work to report further on these. A knowledge of adult mortality and the number of eggs laid is of course necessary before the total effect of weather on the borers can be estimated.

For fear of any misunderstanding it should be kept in mind that the above experiments were carried out in a dairying county where the ordinary farm practice of ensiling or feeding whole nearly all the cornstalks and ploughing under nearly all the stubble does a great deal to prevent a more rapid increase in the number of the borers. In the counties of Essex and Kent, where corn is grown chiefly for husking purposes and where the above methods of dealing with the crop have not up to the present been adopted, even the high larval mortality of 93.58 per cent. would not have prevented a rapid increase in the number of the borers.

THE EUROPEAN CORN BORER—THE OUTLOOK IN ONTARIO

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My reason for giving this paper is that I felt that those of you who had not been able to keep in close touch with the work on the European corn borer might desire to have a brief summary of present conditions in Ontario and to get some idea of what part the borer is likely to play in the future.

The Present Status of the Borer in the Province

Mr. Keenan has shown that the borer has spread to every county which grows corn to any appreciable extent, and that the percentage of infestation has increased greatly in most of the counties which were infested previously to this year. Let us now look a little more fully into the situation in the Province.

In Essex and Kent, where the method of dealing with the corn remnants has been very favourable for the increase of the borer, all the early or moderately early corn this year had borers—often numerous borers—in every stalk, and even the late corn was heavily infested. The result is that most of the farmers realize that they cannot any longer run the risk of growing corn until the borer has been brought under control; hence there will not be more than 10 per cent. of the normal acreage planted to corn next year. So that the corn industry in Essex and Kent is for the time being already almost ruined.

Lambton, Middlesex, Elgin and Oxford are all, with the exception of small areas, heavily infested, the average stalk infestation throughout them being between 30 per cent. and 50 per cent. Fields in all of these counties can be found with 80 per cent. and in three of them with 100 per cent. stalk infestation.

The increase in every other county west of Toronto has been great so that, though three years ago in most of these counties only a field here and there contained borers, to-day almost every field has them, and in many places the infestation has advanced from less than 1 per cent. in 1924 to 20 per cent. or more to-day. Take for instance Norfolk: In 1924 there was not more than 2 per cent. of an average infestation; to-day for forty-six fields examined in various parts of the county the average was 16.1 per cent. and two fields were found, one with 70 per cent. and the other 75 per cent.

East of Toronto borers can be found in almost any field from Toronto to Belleville for several miles back from the lake. In Prince Edward the borer was found in 1924 in a few places, in 1925 it was found in every township; in 1926 the inspector states he has found it in all but one field out of nearly 600 visited. In one field the infestation was as high as 20 per cent.

At the average rate of spread and increase we may expect borers to be found in practically every corn field in Ontario in three years more.

What of the Future?

The most significant thing to my mind about the situation is: first, the enormous increase of the borer in the Province as a whole since 1920—the year of its discovery; and second, the fact that it is now present, even though in small numbers, in almost every field in most of the corn-growing counties.

In 1920 we probably had about 2,000,000 borers, most of them in Elgin and Middlesex. To-day there are, I am sure, at least 1,000,000,000, or 500 times as many as in 1920. It may be interesting to note that if you figure it out you will find that a 500-fold increase in six years is equivalent to an annual increase for that time of three-fold or even a little less.

So much for the rate of increase. Now let us consider what is the significance of the borers' being present, even though in small numbers, in nearly every field west of Toronto and in many fields in the counties east of Toronto up to and including Prince Edward. This means, first, that the moths have a marvellous instinct to spread out widely instead of concentrating in any one area. This fact has in the past lessened the rate of increase of infestation in most of the older areas. Second, it means that the overflow into new territory will soon cease to play any part; for there will be as many moths come in from most of the counties as will go out from them and thus the conditions for even more rapid increase from now on have been brought about. I am speaking now of counties other than Essex and Kent. These two counties next year at least will, I fear, owing to the high infestation and the dropping to a very large extent of corn growing, send out numerous moths to the surrounding counties.

From what has been said, I think all of us must feel that unless effective control measures are adopted by every corn grower, the corn industry will be ruined before many years.

But you will say, "Can that happen in counties where dairying is the main industry and most of the farmers have silos?" I believe the evidence is strong that it will happen in the most up-to-date dairy counties in the Province. Take, for instance, Oxford and Prince Edward; I had hoped for a very low increase in these counties, because of the large percentage of corn that was ensiled and the nearly general practice of ploughing under the stubble. But the facts show that Oxford is rapidly becoming badly infested. Some fields this year near Ingersoll had nearly every stalk attacked. In Prince Edward, too, as already shown, the rate of increase has been startling.

Will the Parasites Check the Increase?—I believe the importation and rearing of parasites is a wise and far-sighted policy, but I am convinced that we have no good reason to hope that parasites will exert any appreciable influence on the situation for ten years and probably not for twenty or more. We must solve our problem before that.

Will a Saturation Point be Reached?—Some have the hope that when the borers have increased all over the Province to such an extent that, say, 50 per cent. on an average of the stalks are infested, a sort of equilibrium will be established. This is a pleasing idea, but it is merely visionary, and what is happening in Essex and Kent shows that a saturation point or a state of equilibrium will only be reached when there are so many borers per plant that the great mass of them will perish of starvation each year.

Would Late Planting Check the Increase?—Late planting in some counties has saved many a corn field from ruin, but late planting is out of the question in fully half of the Province for even ensilage corn, because the season for growth is already almost too short for good yields. Moreover, as the infestation increases there is good reason to believe that even in the warmer parts of the Province late planting after a time will not save the crop, since egg laying will begin on it earlier and even the number of late emerging moths will be great enough to lead to its ruin.

Can We Hope to Save the Corn?—I believe we can, but only by applying the Corn Borer Act and the Regulations thereunder to each county as soon as the amount of infestation justifies it. At present the Act is in operation only in the worst infested counties and in Prince Edward, because I wanted to learn how to run it on a moderate scale before extending it over a larger area. Next year it will be extended to a good many more counties.

We have not yet proven that even compulsory clean-up measures will result in control, but we have several reasons for thinking they will gradually do so:

1. In even the best dairy counties I have seen fields where the stubble was not ploughed under at all but merely disced in spring and sown. This means all the borers in the stubble would survive. Moreover, not more than 40 per cent. of the ploughing that was done buried the stubble properly. Besides this, there are in all these counties a good many farms without silos and on such there are always numerous stalks and pieces of stalks left lying around long enough for the borers to transform into moths and escape. The Act will enable us to remove these sources of infestation and also to insure that sweet corn in private gardens will be looked after.

2. We can bring about lower cutting of corn for silage and other purposes, which will help to make it easier to look after the remnants in the field.

3. Each inspector will be not only an officer to enforce the law but also an educator who will show the farmer how best to accomplish the destruction of all borers on his farm. He will tell him, too, of improved machinery not beyond his reach to purchase.

4. The great farm implement manufacturers, especially in the United States, have been interested in the problem and have been asked to devise new machinery that will aid greatly in destroying the borers in the crop. Attachments have already been invented to put on corn binders to cut corn at the ground. There is a machine now that will cut, husk and shred the corn as it moves along. There are ploughs which will bury standing corn, at least in spring, and that can be used also to cut the plants just below the ground and lay them in rows to facilitate raking and burning. There are stubble beaters with knives revolving at the rate of 1,700 revolutions a minute which pulverize the stubble. I think, however, that there is room still for further inventions; for instance, we need a better rake to gather stubble and debris on the fields in spring. There is no doubt that machinery will play a big part in the future.

5. Some years the weather is unfavourable for the borers and by taking advantage of this fact we can make a great reduction in their numbers. We had a good example of that in Elgin in 1925 when the infestation was greatly lowered in about half the county.

6. In Massachusetts compulsory legislation has resulted in a large diminution in the number of borers.

Some Difficulties that we must Face

In enforcing the Act we shall have difficulties to meet that may some years prevent our making much progress. The chief of these are:

1. Unfavourable weather. This fall is a good example. We had hoped to have a large proportion of the fields cleaned and ploughed before it froze up. In some counties a great deal has been done, but in others the majority of the fields have been so wet that they have not even been cut. This means a great amount of work to do in the spring when the task of getting in the crop early must also be performed. Then some autumns the ground is so hard that it either cannot be ploughed or if ploughed will break up into large chunks and thus not bury the stubble properly.

2. In the heavily infested area many men are going out of corn-growing and every man who does so makes it harder for those who remain in the business, because the moths from his farm will fly to the neighbours'. This is a great

problem in Essex and Kent and affects also the neighbouring counties, but it will solve itself in a couple of years.

3. In the Province as a whole there has been a growing feeling that, quite apart from the corn borer, it is more economical and profitable to grow alfalfa and sweet clover than corn. Here again, every man who puts this idea into practice makes it harder for those who wish to continue to grow corn. But this, too, will settle itself gradually.

4. Then there is the question of the part weeds or other plants may play in the future as breeding plants for the borer. I am hopeful, however, that this is not going to be a serious matter.

5. There are several more difficulties I could name, but I shall mention only one, and that is the securing of the right man as inspector. This is of immense importance. So far we have been, I think, fortunate.

My paper has not been the kind to fill you with optimism and yet I believe there is good reason why we should face the future in this matter hopefully and with the belief that we shall master the borer in this Province and save the corn industry at least for silage or fodder purposes. I doubt, however, whether it will be possible to grow corn for seed again as formerly in Essex and Kent for several years to come, but I hope that ultimately even this result will be achieved.

THE CURRANT FRUIT FLY, *EPOCHRA CANADENSIS* LOEW, IN MANITOBA, DIPTERA, TRYPETIDAE

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The currant fruit fly attacks red and white currants (*Ribes rubrum* L.), flowering currant (*Ribes aurem*, Pursh.), and probably black currant (*Ribes nigrum* L.) in Manitoba. Instances have been reported of injury to black currants, but it was impossible to verify these reports. In other parts of America where this insect is found, black currants, and also gooseberries, are included in the list of host plants.

The currant fruit fly is probably the most destructive insect attacking red and white currants in Manitoba. The damage is caused by the females ovipositing in the partially grown currants. The developing maggots cause many of the currants to ripen prematurely and drop from the bushes. Other infested currants may remain on the bushes until the uninfested fruit is ripe. Usually, however, there is a heavy drop from the bushes before the uninjured portion of the fruit is ripe. In some instances as much as 50 per cent. of the currant crop falls from the bushes due to the injury caused by this insect. If small white maggots are found within the prematurely ripening currants, one may be certain of the identity of the insect as no other insect attacks this fruit in the same manner in Manitoba.

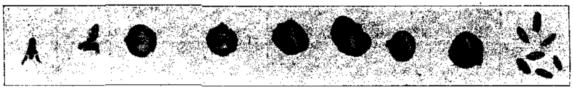
The distribution of this insect in Manitoba is somewhat extended. Records of injury are at hand from practically all of the municipalities adjoining the city of Winnipeg as well as from Winnipeg itself. We also have records from Boissevain, Gilbert Plains, Miami, and Treesbank. It is altogether probable that it occurs throughout the southern part of Manitoba. As currants become more commonly grown in the province we may expect, no doubt, more extensive damage.

Brief Description of Each Stage.—The adult fly is yellowish brown in colour and is somewhat smaller than the housefly. Its most conspicuous markings are on the wings. These are marked with four dark brown cross-bands and one of a similar nature extending along the apical two-fifths of the front margin of the wing. The eyes are shining green. The females are larger than the males, and may also be distinguished from them by the presence of a conspicuous ovipositor.

The egg is a small white object which appears much like a child's elongate toy balloon when examined under magnification. The eggs average one millimeter in length and one quarter of a millimeter in width.

The maggot is white and varies in size according to its stage of development. A pair of black hooks may be seen lying in the anterior part of its body.

The puparium is yellowish in colour. The average puparium varies from four and one-half to five millimeters in length and is two millimeters in diameter.



A B C D

(*a*) Male and female currant fruit flies.
(*b*) Egg showing through skin of currant.
(*c*) Part of currant removed to show maggot.
(*d*) Puparia of currant fruit fly, (slightly reduced).

Life History.—Adult currant fruit flies in a normal year begin to emerge from the soil under the currant bushes about the end of the first week in June. In 1925 the first adults were captured on June 10th and in 1926 on June 9th. At this period of the year common lilacs are just coming into full bloom. Adults were captured from those dates until about July 12th. The adults move about most freely on warm days when they may be taken by sweeping with a net. Frequently adult flies may be seen in the centre of the bush, resting on the leaves where it is shady. The grower would in all probability overlook the presence of these flies in the currant patch, and would learn that they had been there only when the infested fruit began to turn red and drop.

When a female wishes to oviposit she selects a currant about three-quarters grown. Currants of this size are the largest on the bunch at the time the first adults emerge. Evidently currants must be about this size in order that the female may be in an advantageous position to use her ovipositor when she grasps the currant with her feet. On smaller currants the upper side of the currant would be too close to her body for her to do effective work with her ovipositor. After a currant has been selected she bends her ovipositor back underneath the abdomen and slowly inserts it through the skin of the currant. The females observed in the act of ovipositing worked the ovipositor back and forth for from ten to eighteen minutes before appearing satisfied with the opening made in the currant. The mouth parts of the female then began to work back and forth and continued to do this for nearly a minute, after which she left the currant. The egg is left in the currant and is so near the surface that it can be seen through the thin skin if looked for carefully. During 1925 and 1926 the hatching time required for each of twenty-nine eggs was noted. The average time in the egg stage was about six days. Evidently the time, which varied from five to eight days, was determined largely by the temperature of the atmosphere during the egg stage. In late June the eggs required less time to

hatch than they did in mid-June. The young maggot is very small and can be seen with difficulty. Its location is most easily determined by locating the two minute black mouth-hooks which can be distinguished from the surrounding part of the fruit. As soon as the egg hatches the young maggot tunnels underneath the skin of the currant, leaving a white winding air-filled passage. In a very short time, however, it burrows into the centre of the fruit and attacks a seed. Young maggots may nearly always be located feeding on the seeds. The average period spent in the maggot stage is about thirteen days, the extremes being from eleven to sixteen days. When full grown the maggot makes an exit hole through the surface of the currant and emerges. At this time the currant may be either lying on the ground or still hanging to the cluster on the bush. In either case the maggot wriggles out and enters the ground where pupation takes place. If the currants are too badly dried up before the maggot attempts to emerge, it may become stuck in the hole and perish. The maggots enter the soil under the bush where they developed. Puparia were recovered at soil depths varying from a half-inch to three or four inches. The puparia lay in all positions in the soil. The pupal stage lasts for about eleven months. There is only one brood per year. The following tabulation shows some details of the life history of the currant fruit fly.

DATA ON LIFE HISTORY, 1926

Number	Adults introduced	Egg found	Egg hatched	Maggot pupated	Time in egg stage	Time in maggot stage
1.	....	....	June 23	July 6	....	13 days
2.	....	....	June 23	July 5	....	12 days
3.	....	....	June 26	July 8	....	12 days
4.	June 21	June 22	June 28	....	6 days	....
5.	June 21	June 22	June 28	Maggot died	6 days	....
6.	....	June 22	June 29	Maggot died	7 days	....
7.	June 22	June 23	June 29	Maggot died	6 days	....
8.	....	June 23	June 29	Maggot died	6 days	....
9.	June 21	June 22	June 29	July 12	7 days	13 days
10.	June 23	June 24	June 29	July 12	5 days	13 days
11.	June 23	June 24	June 29	July 12	5 days	13 days
12.	June 24	June 25	June 30	July 16	5 days	16 days
13.	June 24	June 25	July 1	July 12	6 days	11 days
14.	June 29	June 30	July 5	....	5 days	....

An examination of many prematurely ripening currants failed to reveal the presence of a maggot or an exit hole from which the maggot had escaped. All of these berries showed evidences of holes made by the ovipositor of the fruit fly. Different lots of ripe and fallen berries were collected from time to time and placed on sifted soil in large glass jars. All of the currants collected had been visited by the female fruit fly, as they showed the mark of her ovipositor. In all some 1,700 currants were collected. Maggots issued from only 12 per cent. of this number. It would seem, therefore, that either the flies do not actually lay eggs in every currant punctured or many maggots perish within the currants before they reach maturity. In any event currants so punctured ripen prematurely and fall from the bushes with a resultant loss to the grower.

The work outlined above was carried out at Manitoba Agricultural College, Winnipeg, during the years 1925 and 1926. No parasites were reared from any

of the material under observation during that time. The work was carried out in the field, in the laboratory, and in a screened outdoor insectary.

SUMMARY

The currant fruit fly has one brood per year. It is injurious to red and white currants and flowering currant in particular in Manitoba, and probably attacks black currant and possibly gooseberry. The injury is caused by currants being attacked by the females. They ripen prematurely and fall from the bushes. Fully 50 per cent. of the currants may be lost in this way in certain seasons. The egg hatches in about six days, the maggot develops in about thirteen days, and the insect is in the pupal stage about eleven months. The adults occur from about the end of the first week of June until about July 12 in a normal year. No practical method of controlling this insect has as yet been successfully demonstrated.

AN OUTBREAK OF THE TURNIP APHID

Aphis pseudobrassicae Davis

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About August 1st rumours of turnips being injured by aphids began to be received, and on August 5th a call for help came in from the Vimy Ridge Farm near Guelph. I at once went to the farm and found that the outbreak was serious, almost every plant in the field having numerous aphids on the under side of the leaves.

Extent of the Outbreak.—At Vimy Ridge I learned that the aphids were equally numerous on several neighbouring farms, and that some of the farmers had already begun plowing down their turnips because they felt the crop was ruined. Gradually, as reports arrived from various localities, it was found that the outbreak was very extensive and covered a large part of the province, extending at least as far west as Elgin county and as far east as Prince Edward and north to at least Palmerston. It may have been all over the province, but I did not receive any complaints from the other parts.

Identity of the Species.—A glance at the aphids would reveal to anyone familiar with our common cabbage aphis, *Aphis brassicae*, that the culprit was not this species but a different one, for *A. brassicae* is conspicuously covered with a whitish powder giving it a mealy appearance, whereas the species in question, later identified for me by Mr. W. A. Ross as *Aphis pseudobrassicae*, was free or almost free from any powdery covering and the body colour was yellowish green often with a tint of brown.

On looking over the *Canadian Insect Pest Review* for October, 1926, I found on page 42 that there had been an important outbreak of this species of aphid in Alberta with serious loss to the crops. I also noticed that in the Maritime provinces an aphid had been very destructive and abundant on turnips and cabbage, but in this case the species was not given. It will not be

surprising if it turns out to have been the same species,* and in that case we have had a remarkable outbreak almost all over Canada.

In the course of my own work since 1908, I have seen several severe outbreaks of *A. brassicae* on turnips as well as cabbage, but I have not before seen any outbreak of *A. pseudobrassicae*, though it may possibly have been this species that was involved last autumn in a local infestation of turnips in Waterloo county, which I did not have a chance to examine.

Of *A. pseudobrassicae*, Professor J. J. Davis says that it was unknown to science until 1914, that it has a very wide range in North America, from Manitoba to Texas and from Massachusetts to California, and that it is remarkably prolific, even more so than the pea aphis.

Whether it is a native species has apparently not been discovered. If it is imported it must have come to North America very many years ago to have become so widely distributed.

Food Plants.—The only plants I found it attacking were fall and Swede turnips. I examined cabbage but found none on it. Rape and other cultivated cruciferous plants were not examined, but there were no reports of injuries to any of these though the aphids may have been present on them.

Davis found that turnips and radishes were favourite food plants, but from the reports of various writers it seems clear that it feeds also on cabbage, rape, wild and cultivated mustards, shepherd's purse and several other cruciferous plants.

Control Experiments.—The following sprays and a dust were tested by me at Vimy Ridge:

1. Soap, 1 pound to 4 gallons of water.
2. Derrisol, 1 can to 70 gallons of water, which was a little stronger than recommended by the manufacturers.
3. Nicotine sulphate 40 per cent., ½ pound plus 3 pounds soap to 50 gallons of water.
4. Kerosene emulsion, approximately 8 per cent., the emulsion being made with several times the ordinary amount of soap.
5. Two per cent. nicotine dust, 5 pounds nicotine sulphate 40 per cent., and 95 pounds hydrated lime.

The sprays were applied with a power sprayer at a pressure of 150 to 200 pounds. One line of hose was used and a three foot iron rod equipped with two disc nozzles The rod was bent near the tip so that the spray could be shot up above the under side of the leaves. With this good equipment every care was taken to make a thorough job, but an examination of the plants a day later showed disappointing results; for, though numerous aphids had been killed by all the mixtures, a sufficient number had escaped to have made reinfestation in a week or so certain if natural forces had not stepped in and destroyed nearly all the aphids.

Of the sprays kerosene emulsion was the most effective, probably because it spread much more readily and widely than the others. Soap was not satisfactory with the outfit used, because the great amount of froth made by the agitator prevented the spray from going through the nozzles freely. Had there been no agitator it would probably have been as good as the kerosene emulsion.

The nicotine dust was applied by a cyclone bellows duster, which had a spoon-like tip on the outlet pipe which made it possible to apply the dust to

*Since writing the above, Mr. Ross has informed me that he has identified this species as *Aphis pseudobrassicae* Davis. Hence the outbreak has been almost Dominion wide, and comparable to the great outbreak of the Corn Ear Worm, *Heliothis obsoleta*, in 1921.

the under side of the leaves. In spite of this I found that a perfect job could scarcely be done without treating each row from both sides. By doing so almost 100 per cent. of the aphids could be killed. A couple of days later Mr. J. A. Flock, in my absence, dusted the college turnip field with a power duster and the same mixture. The duster pipe was equipped with a short T at the outlet, and a long canvas was dragged behind over the plants to concentrate the dust on them. Although the dust was not applied so heavily as he would have liked to apply it, yet the results were, in his opinion, fairly satisfactory but not 100 per cent. kill.

Conclusion re Spraying and Dusting

From the above experiments I am convinced that this aphis will *not* be combated satisfactorily on any large scale by spraying, and that dusting is the only method which will prove effective. Dusting, however, costs about $10 per acre and requires that the farmer have a good hand or power duster, hence I doubt very much whether any one but a market gardener would go to the expense of using the dust.

Duration of the Outbreak.—The outbreak must have been well under way about the beginning of the last week of July It reached its height by about the 10th of August, and nearly all the aphids had disappeared by the 17th of August The cause of their disappearance was not investigated closely, but from what I saw in a field east of Toronto I think it was due chiefly to a fungus disease. Hymenopterous parasites helped some at Guelph, but there were very few ladybird beetles or syrphus fly larvae here, though the latter were numerous on turnip leaves sent in from Stratford.

It may be of interest here to note that a severe local outbreak on cabbage of *A. brassicae* in Essex county, which I examined on August 17th, was found to be rapidly being brought under control by a host of ladybird beetles (*Hippodamia convergens*), aphis lions, syrphus fly larvae, hymenopterous parasites and Cecidomyid larvae.

The Amount of Damage.—As to the amount of damage done by the aphids I was not able to spend the necessary time to make an accurate estimate. I observed, however, that wherever the plants were large and vigorous they seemed to survive the attack and to develop into good sized turnips. Wherever they were small and weak, as a great many were, due either to time of planting or other factors, the aphids practically ruined them. In Wellington county the agricultural representative estimated that the crop had been lessened by at least 50 per cent. There is no doubt that in several of the other counties there was also a large loss though probably not so high as in Wellington.

Conclusion.—Farmers and entomologists are wondering whether this aphid is likely to be abundant in the future. One can only conjecture on this point, but it seems to me that since the aphid has been here for many years and has not caused us any appreciable damage until last year, so far as I know, that there must have been remarkably favourable conditions to have led to this year's outbreak, and these conditions are not likely to occur again for a good many years. Another outbreak like we had this year would mean that most farmers would cease growing turnips and would substitute sugar beets or mangels for them.

SOME NOTES ON THE OVIPOSITION HABITS OF THE TARNISHED PLANT BUG, *LYGUS PRATENSIS* LINN, WITH A LIST OF HOST PLANTS

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During the last eighty years a great deal of investigational work has been carried on by Canadian and United States entomologists, with the tarnished plant bug, *Lygus pratensis* L. However, in most of these studies, the oviposition habits and the relation of broods to host plants do not seem to have been very carefully covered, the bulk of the work consisting of experiments leading directly to control.

The following is an extract from a paper presented before the Entomological Society of Nova Scotia in 1917 by Brittain and Saunders, and sums up the oviposition records of this insect to that date:

"According to Crosby and Leonard, Slingerland, in his noteis on this insect, records his observation of a female actually in the act of ov position in the following words: "I saw one egg laid, the time occupied in the oviposition being nearly a minute. The ovipositor was sunk in the tissue of the midrib nearly to its full extent.' He also records that the eggs are occasionally inserted into the blossom of dahlias, sometimes to the number of eight. These workers, in the same bulletin, further record the finding of eggs deposited in the tender tips of peach nursery stock and in the flower heads of the daisy blossom (Erigeron ramosus). Taylor and Collinge describe the oviposition in young apple fruit. Chittenden and Marsh record finding the eggs inserted in the upper side of the leaf of kale. They further state that in the case of the mullein, which is the food plant for the purpose in the District of Columbia, the eggs are inserted in the petiole or leaf stem and in the midrib. The eggs are placed very close together and in confinement; as many as nine were counted on a single leaf an inch long and half as wide. Regarding this point, Haseman writes as follows: In this region* it deposits its eggs in the fall of the year at least, only in the blossoms of flowers such as daisies, asters, mare's tail (Erigeron canadensis), etc.

It is uncertain, from the writings of the foregoing authors, just what brood they had under observation, as the exact number never appears to have been determined with certainty.

Brittain and Saunders also record the finding of eggs of the overwintering adults on sheep sorrel (*Rumex acetosella*) and eggs of the first generation on beets, mangolds and probably white turnips.

In the spring of 1925 a biological study of this insect was undertaken at Ottawa, Ont., by the author and the egg-laying habits in relation to broods and host plants have been given particular attention.

The field observations to date have shown that the following plants are used as hosts in the Ottawa district by the adults of the overwintering brood:

1. Common mullein—*Verbascum thapsus* L.
2. Black currant—*Ribes nigrum* L.
3. Wild currants—*Ribes* sp.
4. Night flowering catchfly—*Silene noctiflora* L.
5. Strawberry—*Fragaria* sp.
6. Common mustard or charlock—*Brassica arvensis* L.
7. Sheep sorrel—*Rumex acetosella* L.
8. Ox-eye daisy—*Chrysanthemum leucanthemum* L.
9. Common dandelion—*Taraxacum officinale* Weber.

*Missouri.

Of these the dandelion, black and wild currants, night flowering catchfly, and ox-eye daisy are, as far as is known, new records; the others have been recorded by previous workers, although in all cases the brood responsible has not been indicated.

A

(*a*) Showing 5 eggs of the tarnished plant bug, *Lygus pratensis*, *L.* on midrib of mullein leaf.

B

(*b*) Showing egg of tarnished plant bug, *Lygus pratensis*, *L.* oviposited through a bract on a strawberry stem.

The eggs of this insect are laid in such a variety of ways that it is impossible to state any definite location in which they may be found. Thus in the early season eggs were found in the leaf buds of currants and later, as the leaves unfolded, in the petioles. On Mullein, eggs were found in the midribs and the larger leaf veins; on the night flowering catchfly, in the blade of the leaf; on strawberries, in the pedicel of the flowers; on ox-eye daisy, in the receptacle of the flowers; and on willow in the second year bark.

The method of insertion also varies a great deal; in some cases the eggs are buried for their full length in the tissue; in others the egg may protrude for practically its entire length, or only a small tip may remain exposed; and occasionally they may even be found lying loose on a fold in the leaf.

In regard to the regularity of their occurrence in the tissue, or the system of laying followed, there does not seem to be any rule. Eggs are usually found distributed singly though they may be in groups, as many as eight having been counted in a square centimetre on the midrib of a mullein leaf.

Eggs of the overwintering adults were first taken on May 22nd, 1926; these eggs hatched in a few days and the nymphs reached maturity about the middle of July. The adults of these nymphs can, therefore, be called the spring generation.

In field observations eggs of the spring generation were noted in the following plants: 1. Beets. 2. White turnips. 3. Swiss chard. 4. *Helichrysum*. 5. *Erigeron* sp.

Of these, swiss chard and *Helichrysum* are, I think, new records, and Brittain and Saunders' record on white turnips, which was in doubt, is verified.

In conjunction with the field studies caged experiments were also carried on in cheesecloth covered cages, 1′ x 1½′ x 2′ in size, in which from forty to fifty adults were placed. In carrying on this experiment, branches or cuttings of plants, which had been carefully examined for eggs and found free, were placed in vials of water, the neck of the vial being plugged with cotton. These

vials were then sunk in the soil in the cage to bring the neck level with the surface. The adults used were collected in the field and consisted of males and females. Plants were allowed to remain in the cages for periods ranging from twenty-four hours to one week, but in all cases the results were the same. The following comprises a list of plants upon which eggs from overwintering adults were obtained in these cages:

1. Apple—*Prunus* sp.
2. Choke cherry—*Prunus* sp.
3. Black currant—*Ribes nigrum* L.
4. Cultivated aster—*Aster* sp.
5. Chickweed—*Stellaria media* L., Cryid.
6. Horsechestnut—*Aesculus* sp.
7. Willow—*Salix* sp.
8. Prickly lettuce—*Lactuca scariola* L.
9. Milkweed—*Asclepias syriaca* L.
10. Canada fleabane—*Erigeron* sp.
11. Catnip—*Nepeta cataria* L.
12. Common mustard—*Brassica arvensis* L., Klize.
13. Curled dock—*Rumex crispus* L.
14. Golden rod—*Solidago* sp.
15. Flax—*Linum* sp.
16. Rugel's plantain—*Plantago rugelii* Dene.
17. Sheep sorrel—*Rumex acetosella* L.
18. Timothy—*Phleum pratense* L.
19. Buckwheat—*Fagopyron esculenium* (Tourn) L.

In addition to the foregoing, the following plants were similarly exposed in egg-laying experiments without success:

1. Elderberry—*Sambucus canadensis* L.
2. Kentucky blue grass—*Poa pratensis* L.
3. Couch grass—*Agopyron repens* L.
4. Orchard grass—*Dactylis glomerata* L.
5. Red clover—*Trifolium pratense* L.
6. Chickory—*Cichorium intybus* L.
7. Vetch—*Vicia* sp.
8. Peppergrass—*Lepidium virginicum* L.

It is our opinion that these plants were refused, due to the comparative hardness of the tissues. So far as the grasses are concerned, the structure of these plants is apparently not such as to induce the insect to oviposit.

The following list comprises plants upon which eggs were obtained from adults of the spring generation in cages: 1. Cabbage. 2. Potato. 3. Horse-radish. 4. Tomato. 5. Aster. 6. *Helenium.* 7. *Nicotiana.* 8. Seed lettuce.

The plants recorded as hosts of the spring generation in the field were also readily oviposited upon when placed in cages.

From these lists can be summed up the following information:

In field observations there has been established nine known field hosts of the overwintering brood of the tarnished plant bug and also sixteen other hosts upon which it has been possible to secure eggs in cages, making a total of twenty-five. Also there are five hosts of the spring generation recorded in the field, and eight additional ones upon which eggs were oviposited in cages, making a total of thirteen. Thus we have altogether thirty-eight species of plants in the Ottawa district upon which eggs of this insect have been found.

It should be noted that in no case were plants, which had been favoured as hosts by the overwintering generation, found to be hosts of the spring generation.

THE ENTOMOLOGICAL RECORD, 1926

NORMAN CRIDDLE, ENTOMOLOGICAL BRANCH, DOMINION DEPARTMENT OF AGRICULTURE

The year 1926, while rather unfavourable for collecting, was noteworthy for marked entomological activity, and collectors have been busy in nearly every province of the Dominion. Much progress has been made in determining specimens and as a result we are able to provide two important lists on distribution.

Among the numerous entomological publications issued during the year the following should be of particular interest to our readers:

Hemiptera of Eastern North America, by W. S. Blatchley, Nature Publishing Co., Indianapolis, Ind. This important work has not yet come to hand, consequently we are unable to review it. Its importance to hemipterists, however, cannot be doubted.

Revision of the North American Moths of the Subfamilies Laspeyresiinae and Olethreutinae, by Carl Heinrich, Bul. 132, U.S. Nat. Mus., 1926. This paper is a continuation of the revisionary work begun in Bulletin 123 and reviewed in a previous issue of the Entomological Record; it contains many references to Canadian species, several of which are described as new. It is indispensable to workers of the micro-lepidoptera.

Die Chrysops-Arten Nordamerikas einschl, Mexicos (The Species of Chrysops from North America, including Mexico), by O. Krober, in Stettiner Entomologische Zeitung, pp. 209 to 353, 2 plates. This paper, which is the most important contribution to the study of the North American species of *Chrysops* yet published, lists and describes seventy-six species, six of which are new, five of these being from Canada. There are sixty illustrations of wings and abdomen. The following new synonymy is recorded, the names in parenthesis falling to the preceding name: *incisus* Macq. (*neglectus* Will); *wiedemanni* Krob., (*obsoletus* Aut.); *obsoletus* Wied. (*morosus* O.S.); *lateralis* Wied. (*hilaris* O.S.); *geminatus* Wied. (*fallax* O.S.); *fuliginosus* Wied. (*plangens* Wd.). Other synonymy is suggested and much of that already recorded verified from examination of types. (H.C.)

North American Species of Two-winged Flies Belonging to the Tribe Miltogramminae, by H. W. Allen, Proc. U.S.N.M., LXVIII, Article 9, pp. 1-106 (5 plates). This is a thorough discussion of a group of Sarcophagidae which has generally been included in the Tachinidae. All information concerning the group has been brought together and excellent illustrations render the keys easy to follow. Much of the material discussed is from Canada. (H.C.)

NOTES OF CAPTURES

Species preceded by an asterisk (*) described since the last Record was prepared.

LEPIDOPTERA

(Arranged according to Barnes and McDunnough's Check List of the Lepidoptera.)

Pieridae
34 *Pieris protodice* Bdv. & Lec. Montreal, Que., Sepr., (A. C. Sheppard).
57a *Eurymus hecla glacialis* McL.
Oeneis melissa assimilis Butl. (*arctica* Gibs).
Oeneis polyxenes subhyalina Curt.
139 *Erebia rossi* Butl.

193a *Brenthis chariclea arctica* Zett.
196 *Brenthis polaris* Bdv.
197b *Brenthis improba* Butl.

The above seven species or subspecies were taken on Baffin Island by J. D. Soper.

* *Euphydryas nubigena beani* ab. *blackmori* Gun. Victoria, B.C., (Blackmore).
* *Euphydryas perdiccas* ab. *nigrisupernipennis* Gun. Chilcotin, B.C.
* *Euphydryas taylori* ab. *victoriae* Gun. Victoria, B.C.
* *Melitaea palla* ab. *blackmori* Gun. Lytton, B.C.
* *Brenthis epithore* ab. *obscuripennis* Gun. Chilcotin, B.C.
* *Brenthis myrina* ab. *serratimarginata* Gun. Vernon, B.C.

The above six aberrations described in Ent. News. Vol. xxxvii, No. 1, 1926.

* *Eurymus interior* form *napi* B. and Benj. Nepigon, Ont.
* *Eurymus pelidne* form *beri* B. and Benj. Alberta.
* *Coenonympha inornata* race *quebecensis* B. and Benj. Chelsea, Que.
* *Dryas (Argynnis) atlantis* race *beani* B. and Benj. Banff, Alta.
* *Brenthis aphirape* race *nichollae* B. and Benj. Rocky mountains, B.C.

The above five forms described in Bul., S., Cal., Ac., Sc., Vol. xxv, Part 3, 1926.

Sphingidae
747 *Deidamia inscriptum* Harr. Point Pelee, Ont., June, (Walley).

Arctiidae
943 *Hyphoraia lapponica* Thun. Baffin Island, (Soper).

Noctuidae
1192 *Schinia arcigera* Gn., Aweme, Man., Aug., (J. F. May).
1219 *Agrotiphila quieta* Hbn. Baffin Island, (Soper).
1229 *Porosagrotis dolli* Grt. Saskatoon, Sask., May, (King).
1240 *Euxoa olivia* form *anacosta* Sm. Vernon, B.C., Sept., (E. P. Venables).
1318 *Euxoa bostonensis* Gt. St. Thomas, Ont., (L. James).
1327 *Euxoa recticincta* Sm. Sasktoon, Sask., Aug., (King).
2201 *Sympistis zetterstedti* Stand. Baffin Island, (Soper).
2206 *Epigaea decliva* Grt. Montreal, Que., (Sheppard).
2281 *Trachea spaldingi* Sm. Saskatoon, Sask., June, (King).
* *Syneda pedionis* Hamp. Winnipeg, Man., (Wallis). Red Deer River, Alta., (Wolly-Dod).
* *Syneda nichollae* Hamp. Ashnold, B.C., (Mrs. Nicholl).

The above two species described in Lepidoptera Phalaenae of the Subfamily Noctuinae, British Museum (Nat. Hist.), 1926.

2304 *Eremobia jocasta* Sm. Toronto, Ont., Sept., (Parish).
3359 *Anticarsia gemmatilis* Hbn. Montreal, Que., (Sheppard).

Cosmopterygidae
Psacaphora deceptella Braun. Quamichan Lake, B.C., (Hanham).

Gelechiidae
6062 *Evippe prunifoliella* Cham. Fraser Mills, B.C., (Marmont).

Oecophoridae
6437 *Agnopteryx canella* Busck. . Chilcotin, B.C., (G. V. Copley).
6470 *Agnopteryx nubiferella* Wlshm. Shawinigan Lake, B.C., (Blackmore)

Aegeriidae
6745 *Memythrus fraxini* Hy. Edw. Niagara Falls, Ont., July, (Whalley).

Eucosmidae
6840 *Argyroploce mengelana* Fern. Baffin Island, (Soper).
Thiodia olivaceana Riley. Pt. Pelee, Ont., June, (G. S. Walley).
Thiodia lapidana Wlshm. Chilcotin, B.C., (Copley).
. *Thiodia alterana* Hein. Chilcotin, B.C., (Copley).
Eucosma conspicienda Hein. Chilcotin, B.C., (Copley).
Epiblema brightonana Kft. Aweme, Man., July, (Criddle).
Gypsonoma parryana Curt. Baffin Island, (Soper).
Zeiraphera diniana Gn. Hopedale, Labr., July.
Exentera costomaculana Clem. Putnam, Ont., May, (Walley).
Epinotia normanana Kft. Maniwaki, Que., June, (Curran).
Anchylopera platanana Clem. Pt. Pelee, Ont., June, (Walley).
Anchylopera semiovana Zell. Pt. Pelee, Ont., June, (Walley).

Tortricidae

Sparganothis pulcherrimana Wlshm. Pt. Pelee, Ont., June, (Walley).

Hapoloptiliidae

7737 *Haploptilia accordella* Wlshm. Fraser Mills, B.C., (Marmont).

Gracilariidae

7904 *Lithocolletis incanella* Wlshm. Sooke, B.C., (Blackmore).

Tineidae

8281 *Tinea arcella* Fabr. Fraser Mills, B.C., (Marmont).

Lampronia piperella Busck. Paradise Valley, B.C. (W. B. Anderson). Salmon Arm, B.C., (W. R. Buckell). Kaslo, B.C., (Cockle).

Lampronia sublustris Braun. Kaslo, B.C., (Cockle).

Incurvariidae

8442 *Greya punctifella* Wlshm. Victoria, B.C., (Blackmore and Carter).

Greya subalba Braun. Vernon, B.C., (Ruhmann). Ft. Steel, B.C., (Anderson).

Chalceopla cockerelli Busck. Mt. Tzouhalem, B.C., (Blackmore).

Pterophoridae

The following list of Canadian Plume Moths, prepared by Dr. J. McDunnough, is as complete as possible, according to our present records. It is based largely on material in the Canadian National Collection.

Trichoptilus pygmaeus Wlshm. Brit. Col.: Shawnigan, Vancouver Island.

Trichoptilus lobidactylus Fitch. Que.: Chelsea, Aylmer; Ont.: Ottawa, Severn; Alta.: Jasper.

Pterophorus periscelidactylus Fitch. Que.: Aylmer; Ont.: Ottawa, Pt. Pelee, Delhi, Walsh.

Pterophorus ontario McD. Ont.: Normandale.

Pterophorus evansi McD. Ont.: Trenton, Ottawa; Man.: Aweme.

Pterophorus tenuidactylus Fitch. Que.: Aylmer, Hemmingford, Kingsmere; Ont.: Ottawa, Caradoc, Sudbury, Cornwall, Centreville; Man.: Rounthwaite, Aweme; Alta.: Lethbridge, Waterton Lakes; Brit. Col.: Salmon Arm, Duncan, Burnaby.

Pterophorus raptor Meyr. Alta.: Waterton Lakes, Lethbridge.

Pterophorus delawaricus Zell. Alta.: Waterton Lakes; Brit. Col.: Keremeos, Barkerville, Goldstream, Kaslo, Anderson Lake, D'Arcy.

Platyptilia punctidactyla Haw. Ont.: Ottawa; Man.: Aweme, Rounthwaite; Alta.: Nordegg, Laggan, Lethbridge, Waterton Lakes; Brit Col.: Kaslo, Bio. Sta., Departure Bay, Salt Spr. Isd., Ucluelet.

Platyptilia pica Wlshm. Brit. Col.: Wellington, Victoria.

Platyptilia tesseradactyla Linn. Que.: Meach Lake, Aylmer; Ont.: Ottawa; Alta.: Moraine Lake, Waterton Lakes, Nordegg; Brit. Col.: Barkerville, Adams Lake.

Platyptilia carduidactyla Riley. Labrador, Hopedale; Que.: Pt. aux Alouettes; Alta.: Lethbridge; Sask.: Saskatoon, Indian Head; Brit. Col.: Kaslo, Osoyoos, Oliver, Salmon Arm, Vernon, Keremeos, Agassiz, Ucluelet, Bio. Sta., Departure Bay, Victoria, Vancouver.

Platyptilia percnodactyla Wlshm. Alta.: Waterton Lakes; Brit. Col.: Keremeos, Lillooet.

Platyptilia williamsi Grinnell. N. Brun.: Fredericton; Alta.: Nordegg.

Platyptilia albicans Fish. Alta.: Waterton Lakes.

Platyptilia pallidactyla Haw. Que.: Maniwaki; Ont.: Ottawa, Trenton, Orillia, Kearney; Man.: Aweme; Sask.: Last Mountain Lake, Craven.

Platyptilia ardua McD. Brit. Col.: Mt. McLean.

Platyptilia albertae B. &. L. Alta.: Banff; Brit. Col.: Revelstoke, Kaslo.

Platyptilia carolina Kearf. Que.: Hemmingford.

Platyptilia edwardsi Fish. Alta.: Rocky Mountain House, Banff, Moraine Lake, Waterton Lakes, Lethbridge; Brit. Col.: Mt. Cheam, Hedley, Mt. McLean, Lillooet, Keremeos.

Platyptilia orthocarpi Wlshm. Reported from Brit. Col. (G. O. Day), by Lindsey & Blackmore.

Platyptilia fragilis Wlshm. Brit. Col.: Seton Lake, Lillooet.

Platyptilia shastae Wlshm. Man.: Aweme; Alta.: Waterton Lakes; Brit. Col.: Oliver.

Platyptilia nana McD. Alta.: Waterton Lakes, Moraine Lake.

Platyptilia albiciliata var. *canadensis* McD. Alta.: Moraine Lake, Banff, Nordegg, Waterton Lakes; Brit. Col.: Marble Canyon, near Lillooet, Revelstoke, Aspen Grove, Ucluelet, Barkerville, Seton Lake, Lillooet.

Platyptilia albidorsella Wlshm. Alta.: Waterton Lakes.

Platyptilia maea B. & L. Alta.: Moraine Lake, Waterton Lakes, Banff.

Platyptilia modesta Wlshm. Man.: Aweme.

Platyptilia petrodactyla Wlk. Ponds Inlet, Baffin's Land.

Stenoptilia mengeli Fern. Reported from Mt. McLean, B.C., by Lindsey & Blackmore.

Pterophoridae—*Continued.*

Stenoptilia bowmani McD. ALTA.: Calgary, Nordegg.

Stenoptilia exclamationis Wlshm. BRIT. COL.: Ucluelet.

Stenoptilia coloradensis Fern. ONT.: Trenton, Ottawa; MAN.: Aweme; SASK.: Indian Head; ALTA.: Nordegg, Lethbridge, Jasper, Banff.

Stenoptilia columbia McD. ALTA.: Waterton Lakes, Moraine Lake; BRIT. COL.: Seton Lake, Lillooet.

Adaina montana Wlshm. ALTA.: Edmonton.

Adaina montana form *declivis* Meyr. ONT.: Ottawa, Trenton.

Adaina cinerascens Wlshm. ALTA.: Waterton Lakes.

Oidaematophorus occidentalis Wlshm. ALTA.: Waterton Lakes; BRIT. COL.: Keremeos, Oliver, Salmon Arm, Kaslo, Lillooet.

Oidaematophorus downesi McD. BRIT. COL.: Victoria.

Oidaematophorus mathewianus Zell. BRIT. COL.: Duncan, Victoria, Kaslo, Barkerville.

Oidaematophorus eupatorii Fern. QUE.: Chelsea; ONT.: Ottawa, Brockville, Trenton; MAN.: Aweme.

Oidaematophorus guttatus Wlshm. ALTA.: Waterton Lakes; BRIT. COL.: Seton Lake, Lillooet, Kaslo.

Oidaematophorus alaskensis B. & L. Described from Ramparts, Alaska, will probably occur in Yukon Terr.

Oidaematophorus grisescens Wlshm. ALTA.: Lethbridge; BRIT. COL.: Seton Lake, Lillooet, Kaslo.

Oidaematophorus cineraceus Fish. BRIT. COL.: Bio. Sta., Departure Bay.

Oidaematophorus rileyi Fern. ALTA.: Moraine Lake, Waterton Lakes; BRIT. COL.: Oliver.

Oidaematophorus lindseyi McD. MAN.: Aweme.

Oidaematophorus gratiosus Fish. ALTA.: Banff; BRIT. COL.: Barkerville.

Oidaematophorus brucei Fern. MAN.: Aweme; SASK.: Indian Head, Saskatoon; ALTA.: Nordegg; BRIT. COL.: Nicola.

Oidaematophorus inquinatus Zell. ONT.: Trenton; MAN.: Aweme; SASK.: Indian Head, Saskatoon.

Oidaematophorus fishi Fern. ONT.: Kearney; SASK.: Earl Grey; ALTA.: Nordegg, Banff; BRIT. COL.: Kaslo, Nicola, Mt. McLean, Lillooet, Oliver.

Oidaematophorus helianthi Wlshm. BRIT. COL.: Kaslo.

Oidaematophorus homodactylus Wlk. NOVA SCOTIA: Digby; QUE.: Chelsea, Kingsmere; ONT.: Mer Bleue, Ottawa, Trenton; MAN.: Aweme, Rounthwaite; ALTA.: Nordegg, Moraine Lake, Banff, Jasper, Waterton Lakes; BRIT. COL.: Lillooet.

Oidaematophorus elliotti Fern. QUE.: Chelsea, Aylmer.

Oidaematophorus stramineus Wlshm. QUE.: Ottawa Golf Club; ONT.: Trenton, Ottawa; MAN.: Rounthwaite, Aweme; SASK.: Saskatoon, Yorkton; ALTA.: McLeod, Nordegg, Waterton Lakes, Lethbridge, Moraine Lake; BRIT. COL.: Kaslo, Goldstream, Victoria.

Oidaematophorus lacteodactylus Cham. QUE.: Meach Lake; ONT.: Trenton, Toronto, Ottawa; MAN.: Aweme; SASK.: Indian Head, Craven, South Arm, Last Mountain Lake.

Oidaematophorus kellicotti Fish. ONT.: Ottawa, Trenton; MAN.: Aweme; SASK.: Last Mountain Lake; ALTA.: Edmonton.

Oidaematophorus sulphureodactylus Pack. SASK.: Indian Head.

Oidaematophorus costatus B. and L. BRIT. COL.: Nicola.

Oidaematophorus corvus B. and L. ALTA.: Nordegg, Rocky Mountain House, Banff, Waterton Lakes, Jasper; BRIT. COL.: Mt. McLean, Lillooet, Hedley, Kaslo, Salmon Arm.

Oidaematophorus perditus B. and L. MAN.: Aweme.

Oidaematophorus monodactylus Linn. ONT.: Trenton, Ottawa, Toronto, Guelph; MAN.: Rounthwaite, Aweme, Winnipeg; BRIT. Co.: Victoria, Vancouver, Mission, Oliver, Duncan.

Alucitidae

Alucita huebneri Wall. ONT.: Ottawa, Trenton; MAN.: Aweme; SASK.: Regina, Saskatoon; ALTA.: Lethbridge, Jasper; BRIT. COL.: Duncan, Victoria, Wellington, Strathcona.

Eucosmidae

The following list by Dr. J. McDunnough is the continuation and completion of the one begun in the 1924 Report and includes all the known Canadian species of the two remaining subfamilies of the Eucosmidae. As before, it is based on Heinrich's revision and the material in the Canadian National Collection.

Argyroplocinae

Episimus argutanus Clem. ONT.: Trenton, Ottawa, Severn; MAN.: Aweme.
Bactra lanceolana Hbn. Reported by Heinrich from British Columbia.
Bactra furfurana Haw. ONT.: Ottawa.
Bactra verutana Zell. ONT.: Trenton; ALTA.: Lethbridge.
Bactra maiorina Heinr. MAN.: Aweme.
Polychrosis viteana Clem. ONT.: reported from the Niagara district.
Polychrosis cypripediana Forbes. MAN.: Aweme.
Polychrosis yaracana Kft. ONT.: Ottawa, Orillia.
Polychrosis blandula Heinr. MAN.: Aweme.
Ahmosia galbinea Heinr. SASK.: Saskatoon.
Ahmosia aspasiana McD. ONT.: Ottawa.
Endothenia montanana Kft. ONT.: Pt. Pelee.
Endothenia kingi McD. SASK.: Saskatoon, Indian Head.
Endothenia hebesana Wlk. ONT.: Ottawa, Trenton; MAN.: Aweme. ALTA.: Nordegg, Rocky Mountain House, Waterton.
Endothenia infuscata Heinr. MAN.: Aweme.
Endothenia antiquana nubilana Clem. QUE.: Island of Montreal; ONT.: Trenton; MAN.: Aweme, Rounthwaite; SASK.: Indian Head, Regina; ALTA.: Lethbridge, Calgary, Edmonton, Red Deer; BRIT. COL.: Nicola, Oliver, Vancouver.
Taniva albolineana Kft. ONT.: Ottawa; MAN.: Aweme; ALTA.: Nordegg; BRIT. COL.: Invermere.
Tia vulgana McD. ALTA.: Nordegg.
Hulda impudens Wlshm. N.S.: Barrington Passage; ONT.: Ottawa; MAN.: Aweme.
Esia approximana Heinr. MAN.: Aweme.
Zomaria interruptolineana Fern. Recorded by Heinrich from Ontario.
Aphania capreana Hbn. ONT.: Ottawa, Trenton, Sudbury; MAN.: Aweme, SASK.: Saskatoon; ALTA.: Nordegg, Banff; BRIT. COL.: Keremeos, Vancouver.
Aphania youngana McD. QUE.: Meach Lake, Chelsea; ONT.: Ottawa, Hamilton.
Aphania frigidana Pack. N.W.T.: Artillery Lake, Great Slave Lake region.
Aphania tertiana McD. ONT.: Ottawa.
Aphania albeolana Zell. N.S.: Bridgetown
Aphania apateticana McD ONT : Ottawa.
Aphania deceptana Kft. Reported by Heinrich from Man., Sask., and Alta.
Aphania dextrana McD. ONT.: Ottawa; MAN.: Aweme; ALTA.: Calgary, Edmonton.
Aphania infida Heinr. ONT.: Ottawa, Trenton; MAN.: Aweme, Brandon; SASK.: Indian Head; ALTA.: Nordegg.
Aphania removana Kft. QUE.: St. Therese Isl.; ONT.: Trenton; SASK.: Saskatoon; ALTA.: Nordegg.
Sciaphila duplex Wlshm. QUE.: Meach Lake; ONT.: Ottawa, Trenton; MAN.: Aweme; ALTA.: Waterton; BRIT. COL.: Victoria.
Sciaphila duplex thallasana McD. MAN.: Aweme, Lauder.
Badebecia urticana Hbn. QUE.: Meach Lake, Chelsea; ONT.: Ottawa, Severn, Orillia; MAN.: Aweme; SASK.: Regina; ALTA.: Lethbridge, Waterton, Edmonton, Nordegg, Moraine Lake; BRIT. COL.: Kaslo, Salmon Arm, Vernon, Keremos, Victoria, Ucluelet.
Exartema nitidanum Clem. ONT.: Ottawa.
Exartema furfuranum McD. QUE.: Meach Lake; ONT.: Ottawa.
Exartema olivaceanum Fern. N.B.: Fredericton; ONT.: Ottawa, Orillia.
Exartema fraternanum McD. ONT.: Ottawa.
Exartema electrofuscum Heinr. ONT.: Severn; (one female ex larva on Sweet Fern.)
Exartema rusticanum McD. MAN.: Onah.
Exartema zellarianum Fern. ONT.: Trenton.
Exartema atrodentanum Fern. QUE.: Hemmingford; ONT.: Toronto.
Exartema punctanum Wlshm. QUE.: St. Johns.
Exartema cornanum Heinr. ONT.: Ottawa.
Exartema inornatanum Clem. Reported by Heinrich from Quebec.
Exartema clavana Wlk. Reported by Heinrich from Quebec.
Exartema exoletum Zell. QUE.: Aylmer, Chelsea; ONT.: Ottawa.
Exartema bicoloranum McD. N.S.: Barrington Passage.
Exartema quadrifidum Zell. QUE.: St. Hilaire, Aylmer, Hemmingford, Montreal; ONT.: Ottawa; MAN.: Aweme; BRIT. COL.: Rockcreek.
Exartema nigranum Heinr. QUE.: Chelsea, Aylmer; ONT.: Ottawa.
Exartema merrickanum Kft. ONT.: Ottawa.
Exartema corylanum Fern. Reported by Heinrich from Aweme, Manitoba.
Exartema sericoranum Wlshm. Reported by Heinrich from Quebec.
Exartema valdanum McD. QUE.: Aylmer, Ft. Coulonge.
Exartema versicoloranum Clem. ONT.: Trenton.
Exartema brevirostranum Heinr. MAN.: Aweme.
Exartema permundanum Clem. QUE.: Meach Lake, Wakefield; ONT.: Ottawa, Trenton.
Exartema submissanum McD. ONT.: Ottawa.
Exartema nananum McD. ONT.: Mer Bleue, Ottawa.

Argyroplocinae—*Continued.*

Exartema appendiceum Zell. Que.: Hudson, Meach Lake; Ont.: Ottawa; Man.: Aweme.

Exartema concinnanum Clem. Ont.: Ottawa, Pt. Stanley.

Exartema concinnanum form *terminanum* McD. Ont.: Ottawa.

Exartema fasciatanum Clem. Que.: Mt. St. Hilaire; Ont.: Ottawa, Trenton.

Exartema troglodanum McD. Que.: Meach Lake; Ont.: Ottawa.

Hedia separatana Kft. Ont.: Ottawa, Putnam; Man.: Aweme.

Hedia ochroleucana Hbn. N.S.: Bridgetown; Ont.: Ottawa, Trenton; Man.: Aweme; Sask.: Indian Head; Alta.: Edmonton, Lethbridge, Waterton; Brit. Col.: Kaslo, Oliver, Keremeos, Vernon, Victoria, Sydney.

Hedia variegana Hbn. N.S.: Annapolis; Brit. Col.: Agassiz.

Hedia chionosema Zell. Que.: Aylmer; Ont.: Ottawa, Prescott, Guelph.

Hedia cyanana Murt. Man.: Aweme.

Argyroploce auricapitana Wlshm. N.S.: Barrington Passage.

Argyroploce agilana Clem. Que.: Laprairie; Ont.: Ottawa, Whitby, Niagara Glen, Putnam, Pt. Pelee.

Argyroploce albiciliana Fern. Ont.: Severn; Man.: Aweme.

Argyroploce siderana chalybeana Wlshm. Brit. Col.: Kaslo.

Argyroploce sordidana McD. Alta.: Nordegg.

Argyroploce galaxana Kft. Brit. Col.: Langford, Goldstream, Salmon Arm.

Argyroploce galaxana glitranana Kft. Man.: Aweme; Sask.: Regina; Alta.: Banff, Nordegg, Waterton; N.W.T.: Great Slave Lake region.

Argyroploce constellatana Zell. Que.: Montreal, Chelsea; Ont.: Ottawa, Severn.

Argyroploce astrologana Zell. Ont.: Ottawa, Severn; Man.: Aweme; Sask.: Indian Head, Regina; Alta.: Calgary; Brit. Col.: Kaslo, Salmon Arm.

Argyroploce coruscana Clem. Ont.: Pt. Pelee.

Argyroploce puncticostana Wlk. Ont.: Algonquin Park; Alta.: Edmonton.

Argyroploce puncticostana major Wlshm. Alta.: Banff, Nordegg.

Argyroploce deprecatoria Heinr. Brit. Col.: Alta Lake, Mons, Wellington.

Argyroploce cespitana Hbn. Que.: Meach Lake, St Johns; Ont.: Ottawa, Trenton, Severn; Man.: Aweme; Sask.: Regina, Indian Head; Alta.: Edmonton, Nordegg, Red Deer, Waterton, Moraine Lake, Banff; Brit. Col.: Aspen Grove, Kaslo.

Argyroploce carolana McD. Ont.: Ottawa, Lyn, Trenton; Alta.: Waterton.

Argyroploce polluxana McD. Ont.: Ottawa, Mer Bleue; Alta.: Nordegg, Moraine Lake, Banff.

Argyroploce glaciana Moesch. Labr.: Hopedale; N.S.: Barrington Passage; Que.: Meach Lake; Ont.: Ottawa, Severn; Man.: Aweme; Alta.: Edmonton, Nordegg, Calgary, Waterton; Brit. Col.: Salmon Arm; N. W. Terr.: Great Slave Lake region.

Argyroploce bipartitana Clem. Que.: Meach Lake; Ont.: Ottawa, Trenton, Toronto, Orillia, Severn, Pt. Pelee; Man.: Aweme; Alta.: Nordegg, Waterton, Calgary; Brit. Col.: Chilcotin.

Argyroploce heinrichana McD. Labr.: Hopedale.

Argyroploce nordeggana McD. Alta.: Nordegg.

Argyroploce schulziana Fabr. Que.: Rocky Bay, Bonne Esperance, Bradore; Alta.: Nordegg; Brit. Col.: Windermere.

Argyroploce intermistana Clem. Labr.: Hopedale; N.S.: Barrington Passage; Alta.: Laggan; N. W. Terr.: Great Slave Lake region.

Argyroploce septentrionana Curt. Labr.: Hopedale.

Argyroploce inquietana Wlk. N. W. Terr.: Bernard Harbor.

Argyroploce bowmanana McD. Alta.: Nordegg, Moraine Lake.

Argryoploce mengelana Fern. N. W. Terr.: Netilling Lake, Baffin Land.

Argyroploce costimaculana Fern. Labr.: Hopedale; N.S.: Barrington Passage; Que.: Meach Lake; Ont.: Ottawa, Kearney; Alta.: High River.

Argyroploce buckellana McD. Brit. Col.: Salmon Arm.

Argyroploce buckellana albidula Heinr. Ont.: Ottawa; Man.: Aweme; Sask.: Saskatoon, Indian Head.

Evora hemidesma Zell. Ont.: Ottawa, Algonquin Park; Man.: Aweme.

Laspeyresiinae

Dicrorampha kana Bsk. Alta.: Banff, Moraine Lake, Waterton; Brit. Col.: Salmon Arm, Mt. Cheam, Oliver.

Dichrorampha britana Bsk. Alta.: Hillcrest; Brit. Col.: Kaslo.

Dichrorampha simulana Clem. Que.: Meach Lake; Ont.: Ottawa.

Dichrorampha sedatana Bsk. Alta.: Waterton.

Dichrorampha dana Kft. Que.: Meach Lake, Cascades; Ont.: Ottawa.

Dichrorampha leopardana Bsk. Reported by Heinrich from Ontario.

Hemimene felicitana Heinr. Ont.: Pt. Pelee.

Hemimene signifera Heinr. Ont.: Lake of Bays.

Hemimene paula Heinr. Man.: Aweme.

Sereda lautana Clem. Que.: Aylmer; Man.: Aweme.

Laspeyresiinae—*Continued*

Grapholitha molesta Bsk. ONT.: Vineland.
Grapholitha libertina Heinr. Described from Wellington, B.C.
Grapholita prunivora Wlshm. QUE.: Meach Lake; ONT.: Ottawa, Orillia, Severn, Chatham; ALTA.: Waterton.
Grapholitha angleseana Kft. ONT.: Pt. Pelee.
Grapholitha caeruleana Wlshm. BRIT. COL.: Langford, Saanich dist.
Grapholitha conversana Wlshm. BRIT. COL.: Oliver.
Grapholitha imitativa Heinr. ALTA.: Waterton; BRIT. COL.: Salmon Arm.
Grapholitha lunatana Wlshm. MAN.: Aweme; ALTA.: Wabamun, Edmonton; BRIT. COL.: Kaslo, Victoria, Saanich district.
Grapholitha interstinctana Clem. QUE.: Meach Lake; ONT.: Ottawa, Cornwall; ALTA.: Nordegg, Waterton.
Grapholitha lana Kft. Reported by Heinrich from Wellington and Goldstream, B.C.
Grapholitha tristrigana Clem. ONT.: Pt. Pelee, Toronto, London.
Laspeyresia rana Forbes. ONT.: Ottawa; ALTA.: Nordegg.
Laspeyresia obnisa Heinr. Described from Fraser Mills, B.C.
Laspeyresia garacana Kft. Recorded from Trenton, Ont.
Laspeyresia multilineana Kft. MAN.: Aweme; ALTA.: Edmonton.
Laspeyresia ingrata Heinr. Described from Aweme, Man.
Laspeyresia albimaculana Fern. ONT.: Mer Bleue, Ottawa, Niagara Glen.
Laspeyresia populana Bsk. ONT.: Ottawa, Trenton; MAN.: Aweme; ALTA.: Nordegg, Lethbridge.
Laspeyresia youngana Kft. ONT.: Ottawa; MAN.: Aweme.
Laspeyresia nigricana Steph. N.S.: Truro; MAN.: Brandon; ALTA.: Nordegg.
Laspeyresia fletcherana Kft. ONT.: Ottawa.
Laspeyresia prosperana Kft. ALTA.: Waterton, Hillcrest; BRIT. COL.: Kaslo, Hedley, Goldstream, Malahat.
Laspeyresia lautiuscula Heinr. Described from Fraser Mills, B.C.
Laspeyresia flexiloqua Heinr. ALTA.: Calgary.
Laspeyresia americana Wlshm. Recorded by Heinrich from B.C.
Laspeyresia miscitata Heinr. BRIT. COL.: "Interior."
Melissopus latiferreanus Wlshm. ONT.: Trenton.
Carpocapsa pomonella Linn. QUE.: Hemmingford; ONT.: Ottawa, Vineland; BRIT. COL.: Kaslo, Kamloops.
Ecdytolopha insiticiana Zell. ONT.: Trenton.

COLEOPTERA

(Arranged according to Leng's Catalogue of Coleoptera, 1920)

Cicindelidae

74 *Cicindela punctulata* Oliv. Medicine Hat, Alta., (F. S. Carr).

Carabidae

115 *Trachypachus inermis* Mots. Edmonton, Alta., (Carr).
439 *Bembidion obliquulum* Lec. Medicine Hat, Alta., (Carr).
487 *Bembidion planiusculum* Mann. Edmonton, Alta., (Carr).
503 *Bembidion breve* Mots. Edmonton, Alta., (Carr).
514 *Bembidion quadrulum* Lec. Pincher, Alta., (Carr).
560 *Bembidion nitens* Lec. Edmonton, Alta., (Carr).
661 *Bembidion obtusangulum* Lec. Medicine Hat, Alta., (Carr).
* *Bembidion yukonum* Fall. Dawson, Y.T., (Fall).
695 *Bembidion constrictum* Lec. Dundern, Sask., (Criddle).
721 *Bembidion timidum* Lec. Edmonton and Pincher, Alta., (Carr).
726 *Bembidion scudderi* Lec. Medicine Hat, Alta., (Carr).
Bembidion obtusidens Fall. Dundern, Sask., (Criddle); Winnipegosis, Man., (Wallis and E. Criddle).
730 *Bembidion oberthüri* Hayd. Edmonton, Alta., (Carr).
732 *Bembidion aenicolle* Lec. Edmonton, Alta., (Carr).
741 *Bembidion dubitans* Lec. (Edmonton and Medicine Hat, Alta., (Carr).
754 *Bembidion sulcatum* Lec. Edmonton, Alta., (Carr).
* *Bembidion lachnophoides* Darl. Medicine Hat, Alta., (Carr). Psyche, Vol. XXXIII, 1926.
1153 *Poecilus scitulus* Lec. Medicine Hat, Alta., (Carr).
1483 *Calathus ingratus* Dej. Cypress Hills, Alta., (Carr).
1499 *Rhadine dissecta* Lec. Castor, Alta., (Carr).
1650 *Lebia divisa* Lec. Transcona, Man., (S. Brooks).
1747 *Cymindis borealis* Lec. Tofield, Alta., (Carr).
Chlaenius frosti Carr. Cypress Hills, Alta., (Carr).
Chalenius albertinus Csy. Cypress Hills, Alta., (Carr).

Dytiscidae
- * *Coelambus borealis* Fall. Dawson, Y.T., (Fall).
- *Hydroporus planiusculus* Fall. Cypress Hills, and Medicine Hat, Alta., Michel, B.C., (Carr).
- * *Hydroporus yukonensis* Fall. Dawson, Y.T., (Fall); Jasper, Alta., (F. Neave).
- * *Hydroporus alaskanus* Fall. Keremeos, B.C., (Criddle).
- 2568 *Agabus obliteratus* Lec. Medicine Hat, Cypress Hills and Pincher, Alta., (Carr).
- 2589 *Ilybius subaeneus* Er. Aweme East, Man., (Wallis); Lytton, B.C., (Auden).
- 2597 *Ilybius discedens* Shp. Aweme and Riding Mts., Man., (Wallis and E. Criddle).

Gyrinidae
- 2692 *Gyrinus aquiris* Lec. Husavick, Man., (Wallis).

Staphylinidae
- * *Stenus frigidus* Fall. Edmonton, Alta.
- * *Philonthus septentrionis* Fall. Dawson, Y.T., (Fall).
- *Philonthus fraternus* Fall. Dawson, Y.T., (Fall).

Histeridae
- 6530 *Hololepta aequalis* Say. Medicine Hat, Alta., on Cottonwood, (Carr).

Lampyridae
- 6977 *Lucidota fenestralis* Melsh. Medicine Hat, Alta., (Carr).

Cantharidae
- * *Podabrus fissilis* Fall. Emerald Lake, B.C., (A. Fenyes).
- 7074 *Podabrus puncticollis* Kby. Onah and Husavick, Man., (Wallis).
- 7100 *Cantharis nigritulus* Lec. Victoria Beach, Man., (Wallis).

Melyridae
- 7208 *Collops bipunctatus* Say. Medicine Hat, Alta., (Carr).
- 7217 *Collops punctulatus* Lec. Medicine Hat, Alta., (Carr).

Pedilidae
- 8263 *Pergetus campanulatus* Lec. Medicine Hat, Pincher and Edmonton, Alta., (Carr).

Anthicidae
- 8315 *Notoxus cavicornis* Lec. Medicine Hat, Alta., (Carr).
- 8389 *Anthicus scenicus* Csy. Saskatoon, Sask., (King); Edmonton, Alta., (Carr).
- 8401 *Anthicus flavicans* Lec. Medicine Hat, Alta., (Carr).
- 8407 *Anthicus hastatus* Csy. Medicine Hat, Alta., (Carr).
- 8411 *Anthicus coracinus* Lec. Edmonton, Alta., (Carr).

Elateridae
- 8710 *Ludius fusculus* Lec. Medicine Hat, Alta., (Carr).
- 8818 *Cryptohypnus planatus* Esch. Pincher, Alta., (Carr).
- 8839 *Hypnoidus dispersus* Horn. Pincher, Alta.
- 8849 *Hypnoidus pectoralis* Say. Pincher, Alta.
- 8960 *Elater pedalis deletus* Lec. Victoria Beach, Man., (Wallis).
- 9094 *Cardiophorus pubescens* Blan. Medicine Hat, Alta., (Carr).

Buprestidae
- 9272 *Acmaeodera pulchella* Herbst. Medicine Hat, Alta., (Carr).
- 9376 *Buprestis confluenta* Say. Medicine Hat, Alta., (Carr).
- 9522 *Agrilus cephalicus* Lec. Medicine Hat, Alta., (Carr).

Dascillidae
- 9679 *Eucinetus testaceus* Lec. Victoria Beach, Man., (Wallis).

Dermestidae
- * *Trogoderma sinistra* Fall. Dawson, Y.T., (Fall).
- 9835 *Anthrenus verbasci* varius Fab. Winnipeg, Man., (Wallis).

Cucujidae
- 10261 *Laemophloeus pusillus* Schön. Winnipeg, Man., (Wallis).

Coccinellidae
- 11158 *Ceratomegilla fuscilabris* Muls. Winnipeg, Man., (Wallis).
- 11183 *Coccinella tricuspis* Kby. Cypress Hills, Alta., (Carr).
- *Chilocorus fraternus* Lec. Cypress Hills, Alta., (Carr).

Bostrichidae
12908 *Stephanopachys substriatus* Payk. Medicine Hat, Alta., (Carr).

Scarabaeidae
13345 *Trox atrox* Lec. Medicine Hat, Alta., (Carr).

Cerambycidae
* *Tetropium alaskanum* Fall. Dawson, Y.T., (Fall).

Chrysomelidae
15213 *Donacia pusilla* Say. Cypress Hills, Alta., (Carr).
15233 *Zeugophora varians* Cr. Medicine Hat, Alta., (Carr).
15493 *Cryptocephalus confluens* Say. Medicine Hat, Alta., (Carr).
15499 *Cryptocephalus insertus* Hald. Medicine Hat, Alta., (Carr).
Phytodecta notmani Schaef. Cypress Hills, Alta., "on willow only" (Carr).
15734 *Trirhabda attenuata* Say. Medicine Hat, Alta., "on sage brush only" (Carr).
Disonycha latifrons Schaef. Medicine Hat, and Pincher, Alta., (Carr).
16010 *Chaetocnema opulenta* Horn. Medicine Hat, Alta., (Carr).
16148c *Jonthonota novemmaculata* Mann. Medicine Hat, Alta., (Carr).

Mylabridae
16175 *Mylabris discoideus* Say. Medicine Hat, Alta., (Carr).

Curculionidae
16336 *Auletes congruus* Walk. Medicine Hat, Alta., (Carr).
16620 *Evotus naso* Lec. Medicine Hat and Edmonton, Alta., (Carr).
16762 *Phytonomus castor* Lec. Cypress Hills, Alta., (Carr).
18103 *Sphenophorus ochreus* Lec. Medicine Hat, Alta., (Carr).

Scolytidae
* *Hylastes yukonis* Fall. White Horse and Dawson, Y.T., (Fall).
All the new species listed above under Fall were described in the Pan-Pacific Entomologist, Vols. II and III, 1926.

Diptera

Prepared by C. H. Curran

Species described as new in the Canadian Entomologist during the year 1926 are omitted from the record. The number given before the name of a species refers to the page in Aldrich's "catalogue" on which the name of the genus appears.

Tipulidae
*59 *Limnophila auripennis* Alexander. Orillia, Ont., June 10, (Curran).
* *Limnophila platyphallus* Alexander. Orillia, Ont., June 10, (Curran).
The above two species described in Bull. Brook. Ent. Soc. XXI, 111-113.

* *Limnophila harperi* Alexander. Athabasca Delta, Alta., June 18, (F. Harper).
* *Limnophila mc-dunnoughi* Alexander. Nordegg, Alta., July 14, (J. McDunnough).
* *Ormosia garretti* Alexander. Banff, Alta., July, 1922, (C. Garrett).
* *Ormosia hubbelli* Alexander. Aweme, Man., Aug. 15, (N. Criddle).
The above four species described in Ins. Ins. Menst., XIV. 19-23.

*92 *Dicranota currani* Alexander. Ottawa, Ont., Hull, Que., May 9, 1923-1924. (Curran).
*99 *Tipula parvemarginata* Alexander. Portage la Prairie, Man., July, (A. J. Hunter).
The above two species described in Ent. News, XXXVII.

* *Tipula perparvula* Alexander. Aweme, Man., June 29, (Criddle).
Described in Ins. Ins. Menst., XIV, 120.

Psychodidae
*105 *Pericoma aldrichana* Dyar. Anchorage, Alaska, June 15, (J. M. Aldrich).

Culicidae
121 *Anopheles maculipennis* Meigen. Indian Head, Sask., (E. Hearle).
Culiceta dyari Coq. Odessa, Sask., (Hearle).
126 *Culex apicalis* Ad. Indian Head, Sask., (Hearle).
134 *Aedes nigromaculis* Lud. Indian Head, Sask., (Hearle).

Cecidomyidae
156 *Asphondylia helianthiflorae* Felt. Montreal, Quebec, Oct. 18-27, 1926, (A. F. Winn).
On *Helianthus decapetalus*.

Simulidae
168 *Simulium forbesi* Mall. Aweme, Man., July, on crow, (N. Criddle).

Blephariceridae
171 *Bibiocephala grandis* O. S. Seton Lake, B.C., May 31, (McDunnough).

Stratiomyidae
* *Beris annulifera brunnipes* Johnson. Labrador.
* *Beris annulifera luteipes* Johnson. Kearney and Lake Nipigon, Ont.
The above described in Psyche, XXXIII, 109.

Tabanidae
*195 *Chrysops wiedemanni* Krober. Quebec and Ontario.
* *Chrysops canadensis* Krober. Mer Bleu, Ottawa, Ont., June 7, 1925, (Curran).
* *Chrysops pilumnus* Krober. Jordan, Ont., June 21, 1917, (W. A. Ross).
* *Chrysops moerens confusus* Krober. Oliver, B.C., Aug. 13, 1923, (C. Garrett).
* *Chrysops geminatus impunctus* Krober. Port Stanley, Ont., June 25, (C. R. Twinn).
* *Chrysops ornatus* Krober. Jordan, Ont., July 17.
The above described in Stett. Ent. Zeit., for 1926.

Chrysops fuliginosus Wiedemann. Kings Co., N.S., July.

Bombyliidae
Anthrax pauper Loew. Seton Lake, B.C., June, (McDunnough).
Villa sabina O.S. Seton Lake, B.C., June, (McDunnough).
Villa gracilis Meig. Carcross, Yukon, Aug., (Mrs. T. D. A. Cockerell).
Villa molitor Loew. Carcross, Yukon, Aug., (Mrs. T. D. A. Cockerell).
Villa aggripina O.S. Seton Lake, B.C., June, (McDunnough).
235 *Bombylius albocapillus* Loew. Medicine Hat, Alta., April, (F. S. Carr).

Therevidae
246 *Psilocephala limata* Coq. Waterton, Alta., July, (H. L. Seamans).
Psilocephala signatipennis Cole. Oliver, B.C., July, (E. R. Buckell).
Psilocephala baccata Coq. Aweme, Man., May, (N. Criddle, R. M. White); Medicine Hat, Alta., May, (F. S. Carr).
Psilocephala albertensis Cole. Aweme, Man., June, (N. Criddle and R. M. White).
Dialineura crassicornis Will. Duncan, B.C., June, (W. Downes).
247 *Thereva johnsoni* Coq. Saanich District, B.C., July 24, (W. Downes).
Thereva flavicincta Loew. Aylmer, Que., July, (H. L. Viereck); Burkes Falls, Ont., July, (F. Ide).
Thereva strigipes Loew. Macdiarmid, Ont., July, (N. K. Bigelow).

Asilidae
253 *Leptogaster hirtipes* Coq. Seton Lake, B.C., July 6, (McDunnough).
Leptogaster aridus Cole. Seton Lake, Lillooet, B.C., June 15, (McDunnough); Vernon B.C., July, (N. L. Cutler).
260 *Lasiopogon quadrivittatus* Jones. Medicine Hat, Alta., May 8, (F. S. Carr).
Lasiopogon aldrichi Mel. Banff, Alta., July, (C. Garrett).
Lasiopogon cinereous Cole. Frank, Alta., Aug. 15, (E. H. Strickland).
Buckellia (Cophura) brevicornis Will. Seton Lake, Lillooet, B.C., June, July, (Mc Dunnough).
266 *Nicocles punctipennis* Mel. Medicine Hat. Alta., April 24, (F. S. (Carr).
275 *Erax subcupreus* Schiner. Medicine Hat, Alta., June, (F. S. Carr).
282 *Asilus coquilletti* Hine. Seton Lake and Anderson Lake, B.C., June, (McDunnough).

Dolichopodidae
288 *Diaphorus adustus* Van Duzee. Nyarling River, N.W.T., July, (J. Russell).
292 *Rhaphium crassipes* Meigen. Alta Lake, Mons, B.C., June 10, (McDunnough).
Rhaphium campestre Curran, Allan, Sask., Aug., (K. M. King).
293 *Neurigona carbonifera* Loew. Orillia, Ont., June 27, 29, (Curran); Niagara Glen, Ont June 23, (G. S. Walley).
Neurigona deformis Van Duzee. Orillia, Ont., June 26, 28, (Curran).
Neurigona pectoralis Van Duzee. Niagara Glen, Ont., June, July, (G. S. Walley).
Neurigona aestiva Van Duzee. Tillsonburg, Ont., June 4, Niagara Glen, Ont., June 2 (Walley).
Neurigona planipes Van Duzee. Seton Lake, Lillooet, B.C., June 9, (McDonnough).
*295 *Thinophilus spinipes* Van Duzee. Baldur, Man., (N. Criddle).
This species described in Ann. Ent. Soc. Am., XIX, 46.

Thinophilus fulvidorsum Van Duzee. Nyarling River, N.W.T., July, (J. Russell).
295 *Medetera halteralis* Van Duzee. Laprairie, Que., July, (F. Ide).

Dolichopodidae—*Continued.*
296 *Hydrophorus philombrius* Wheeler. Orillia, Ont., June, (Curran).
Hydrophorus fumipennis Van Duzee. Nettilling Lake, Baffin Land, May 30, (J.D. Soper).
Hydrophorus claripennis Van Duzee. Saskatoon, Sask., May, (K. M. King).
Hydrophorus purus Curran. Richdale, Alta., Aug., (K. M. King).
Hydrophorus cerutias Loew. Richdale, Alta., Aug. 22, (K. M. King).
* *Hydrophorus albomaculatus* Van Duzee. Aweme, Man., July 12, (R. D. Bird).
* *Hydrophorus argentifacies* Van Duzee. Treesbank, Man., Sept. 16, April 16, (N. Criddle).
* *Hydrophorus flavipennis* Van Duzee. Wainfleet, Ont., July 20, (M. C. Van Duzee).
* *Hydrophorus lividipes* Van Duzee. Aweme, Man., April 8, (N. Criddle).
* *Hydrophorus nigrinervis* Van Duzee. Kamloops, B.C., July 30, (N. Criddle).

The above five species described in Psyche, XXXIII, 46-51.

298 *Dolichopus pernix* Mel. & Br. Cypress Hills, Sask., June, (C. H. Young).
Dolichopus virga Coq. Severn, Ont., July, (Curran).
Dolichopus indigina Van Duzee. Teulon, Man., Aug. 5, (A. J. Hunter).
Dolichopus conspectus Van Duzee. Baldur, Man., June, (R. M. White).
Dolichopus uxorcula Van Duzee, Victoria Beach, Man., Sept., (N. Criddle).
Dolichopus nigricornis Meigen (*discifer* Stann), Alta Lake, B.C., June 11, (McDunnough).
Dolichopus maculitarsis Van Duzee, Nyarling River, N.W.T., July, (J. Russell).
Dolichopus nigricauda Van Duzee, Nyarling River, N.W.T., July, (J. Russell).
306 *Hercostomus unicolor* Loew, Saskatoon, Sask., July, (K. M. King).

Syrphidae
344 *Microdon Champlaini* Curran, Orillia, Ont., June 28, Severn, Ont., July 3, (Curran).
Microdon albipilis Curran. Lethbridge, Alta., Aug., (E. R. Tinkham).
347 *Chrysotoxum perplexum* Johnson. Transcona, Man., Sept., (G. S. Brooks).
363 *Syrphus attenuatus* Hine. Carcross, Yukon, Aug., (Mrs. T. D. A. Cockerell).
Syrphus limatus Hine. Atlin, B.C., Aug., (Mrs. T. D. A. Cockerell).
Syrphus perplexus Osb. White Horse, Yukon, Aug., (Mrs. T. D. A. Cockerell).
360 *Melanostoma kelloggi* Snow. Mt. McLean, B.C., July 12, (E. R. Buckell).
358 *Pyrophaena granditarsis* Forst. Nyarling River, N.W.T., July, (J. Russell).
Cartosyrphus plumosa Coq., Bearberry Creek, Sask., July 23, (C. H. Young).
Cartosyrphus sororcula Will. Cypress Hills, Sask., June 26, (C. H. Young).
351 *Chilosia ferruginea* Lov. Cypress Hills, Alta., May, (F. S. Carr).
Chilosia nigroapicata Curran. Cypress Hills, Alta., May, (Carr).
348 *Chrysogaster sinuosa* Bigot. Seton Lake, Lillooet, B.C., June 5, (McDunnough).
Chrysogaster nigripennis Will. Alta Lake, Mons, B.C., June 2, (McDunnough).
394 *Asemosyrphus willingi* Smith. Baldur, Man., July, (G. S. Brooks); Nyarling River, N.W.T., July, (J. Russell).
400 *Brachypalpus parvus* Will. Pincher, Alta., May, (Carr).
397 *Xylota bicolor* Loew. Niagara Glen, Ont., June 23, (G. S. Walley).
Xylota florum Fabr. Nyarling River, N.W.T., July, (J. Russell).
* *Xylota confusa* Shannon, . B.C.
* *Xylotomima nemorum americanum* Shann. Kaslo, B.C.

Both the above described in Proc. U.S.N.M., lxix, Art. 9.

Conopidae
410 *Zodion obliquefasciata* Macq. Beaver Creek, Sask., July, (N. J. Atkinson).
412 *Myopa vesiculosa varians* Banks. McLeod, Alta., May, Irvine, Alta., May, (Carr).

Trypaneidae
608 *Eutreta diana* O.S. Seton Lake, Lillooet, B.C., June, (McDunnough); Medicine Hat, Alta., Aug. 24, (Criddle).
Eutreta longicornis Snow, Medicine Hat, Alta., June 20, (Carr).
608 *Carphotricha culta* Coq. Pincher, Alta., May 2, (Carr).

Ephydridae
629 *Ephydra obscuripes* Loew. Seton Lake, Lillooet, B.C., June, (J. McDunnough).
630 *Scatella palludum* Meigen. Cape Prince of Wales, Alaska, June, (D. Jenness).

Micropezidae
*615 *Micropeza lineata* V.D. Aweme, Man., June, (Criddle); Winnipeg, Man., July, (J. Fletcher); Orion, Alta., Aug., (H. L. Seamans).

Described in Pan. Pac. Ent., iii, 2, 1926.

Micropeza furcana Townsend. Aweme, Man., June, (Criddle); Lethbridge, Alta., June, G. A. Mail).
616 *Calobata mima* Cress. Triangle, Sask., July, (N. J. Atkinson).
* *Calobata kennicotti* Banks. "Huds. Bay Terr."
Psyche, xxxiii, 43.

Scatophagidae

567 *Microprosopa lineata* Zett. Cape Prince of Wales, Alaska, June, (D. Jenness).

Muscidae

551 *Hydrophoria alaskensis* Mall. Nettilling Lake, Baffin Land., July, (J. D. Soper).
Hydrophoria elongata Mall. Baldur, Man., July, (G. S. Brooks); Cypress Hills, Sask., July, (C. H. Young).
Hydrophoria ambigua Meig. Baldur, Man., July 19, (Brooks).
554 *Eremomyia incompleta* Stein. Medicine Hat, Alta., March, April, (Carr).
Eremomyoides setosa Stein. Medicine Hat, Alta., April, (Carr).
*534 *Hydrotaea abdominalis* Aldrich. Kaslo, B.C.

Proc. U.S.N.M., lxix, Art. 22.

Alliposis obesa Mall. Nettilling Lake, Baffin Land, July, (J. D. Soper).
Helina latifrontata Mall. Teulon, Man., July, (A. J. Hunter).
Helina nasoni Mall. Cypress Hills, Sask., July, (C. H. Young).
Helina bispinosa Mall. Stormy Mt., Man., Aug., (A. J. Hunter).
Hebecnema affinis Mall. Burkes Falls, Ont., July, (F. Ide).
546 *Limnophora leucogaster* Zett. Stormy Mt., Man., Aug., (A. J. Hunter).
542 *Trichopticus diffinis* Mall. Riding Mts., Man., July, (G. S. Brooks).
560 *Coenosia lata* Walker. Cypress Hills, Alta., May, (Carr).

Calliphoridae

Steringomyia montana Shann. Edmonton, Alta., Aug., (E. H. Strickland).

Sarcophagidae

Emblamasoma erro Aldrich. Seton Lake, Lillooet, B.C., June, (McDunnough).
510 *Sarcophaga eleodis* Ald. Seton Lake, Lillooet, B.C., June, (McDunnough).
* *Eumacronychia elongata* Allen. Glenboro, Man., June, (H. A. Robertson).
* *Metopia opaca* Allen. Ottawa, Ont., July 26, (Curran).
* *Pachyophthalmus distortus* Allen. Barber Dam, New Brunswick, June, (J. D. Tothill); Muskrat Falls, Labr., July, (S. E. Arthur); Kaslo, B.C., (Currie).
* *Phrosinella aldrichi* Allen. Oliver, B.C., June 7, (C. Garrett).
* *Phrosinella pilosifrons* Allen. Lillooet, B.C., July, (J. D. Tothill); Penticton, B.C., June, (W. B. Anderson); Victoria, B.C., July, (W. Downes).

The above species described in Proc. U.S.N.M., lxviii, Art. 9.

Tachinidae

426 *Myiophasia clistoides* Towns. Stony Mt., Man., Aug., (J. B. Wallis).
* *Cylindromyia compressa* Ald. Banff, Alta., (C. Garrett).
* *Cylindromyia vulgaris* Ald. Victoria, William Head, Saanich District, (Downes); Vernon, (N. L. Cutler); Oliver, (P. N. Vroom, E. R. Buckell); Penticton, (R. C. Treherne); Lillooet, (W. B. Anderson) *All localities in B.C.*

The preceding two species described in Proc. U.S.N.M., lxciii, Art. 23.

* *Cryptomeigenia muscoidea* Curran. Aweme, Man., (Criddle); Teulon, Man., May, (A. J. Hunter); Orillia, Ont., June, (Curran).
* *Cryptomeigenia ontario* Curran. Belleville, Ont., (Evans); Chatham, Ont., (Walley); Mer Bleu, Ottawa, (R. H. Ozburn); Hull and Aylmer, Que., (Curran); Aweme, Man., (H. A. Robertson). May and June.
* *Cryptomeigenia triangularis* Curran. Fredericton, N.B., May, (L. S. McLaine); Aylmer, Que., May, June, (C. B. Hutchings); Fairy Lake, near Hull, Que.; Teulon, Man., June, (Hunter); Aweme, Man., June, (H. A. Robertson).
* *Cryptomeigenia nigripilosa* Curran. Lillooet, B.C., June, (J. D. Tothill).
* *Cryptomeigenia nigripes* Curran. Bothwell, Ont., June, (Walley).
* *Cryptomeigenia simplex*, Curran. Hull and Aylmer, Que., May, (Curran).
* *Cryptomeigenia dubia* Curran. Point Pelee, Ont., June, (Walley).
* *Cryptomeigenia ochreigaster* Curran. Aweme, Man., May, (R. M. White); Winnipeg, Man., June, (F. B. Fetterman).
* *Tachinomyia variata* Curran. Ont., Que., Man., Alta.
* *Tachinomyia apicata* Curran. Que., Ont., Man., B.C., N.S.
* *Tachinomyia occidentalis* Curran. B.C., Man.

The above species described in *Trans. Royal Soc. Can., Sec. V, 1926.*

* *Ursophyto rufigena* Aldrich. Eberts, B.C., June 19, 1914, (R. H. Chrystal).

Described in Proc. U.S.N.M., lxix, Art. 22, 14.

Pseudotachinomyia webberi Smith. Medicine Hat, Alta., April, (Carr).
Dexodes aurifrons Coq. Low Bush, Lake Abitibi, Ont., Aug., (N. K. Bigelow).
Lydella polita Towns. Seton Lake, Lillooet, B.C., June, (McDunnough).
462 *Frontina spectabilis* Aldrich. Seton Lake, Lillooet, B.C., July, (McDunnough).
464 *Sturmia bakeri* Coq. Cypress Hills, Sask., July, (C. H. Young).
Zenillia submissa A. & W. Cameron Lake, Alta., Aug., (K. M. King).

Hymenoptera

Ichneumonidae

- * *Campoplegidea totalis* Vier. Aylmer, Que., Aug., (A. R. Graham).
- * *Campoplegidea fuscitarse* Vier. Ottawa, (Harrington).
- * *Campoplegidea mimeticus* Vier. Rigaud and Montreal, Que., (J. Beaulieu); Hull, Que., (Harrington); Jordon, Ont., (W. A. Ross).
- * *Campoplegidea subtilis* Vier. Banff, Alta., (Garrett).
- * *Campoplegidea woodi* Vier. Coldstream, Ont., (A. A. Wood).
- * *Campoplegidea erythromera* Vier. Ottawa, Ont., (Harrington).
- * *Campoplegidea erythrosoma* Vier. Montreal, Que., Ottawa, Ont., (Harrington).
- * *Campoplegidea nigritibialis* Vier. Victoria, B.C., (W. Downes).
- * *Campoplegidea curvata* Vier. Sudbury, Ont., (Evans).
- * *Campoplegidea sessilis* Vier. Montreal, Que.
- * *Campoplegidea citripes* Vier. Lanoraie, Que., (J. I. Beaulne).
- * *Campoplegidea flavicoxa* Vier. Montreal, Que., (Beaulieu).
- * *Campoplegidea varicoxa* Vier. Sudbury, Ont., (Evans).
- * *Campoplegidea montrealensis* Vier. Montreal, Que.
- * *Campoplegidea reticulata* Vier. Royal Oak, B.C., (W. Downes).
- * *Campoctonus fossatus* Vier. Aweme, Man., (P. N. Vroom).
- * *Pseudocasinaria paenealia* Vier. Sudbury, Ont.
- * *Pseudocasinaria decorata* Vier. Ottawa, Ont., (Harrington).
- * *Amorphota pacifica* Vier. Victoria, B.C., (Downes).
- * *Amorphota bicoloripes* Vier. Aweme, Man., (Criddle).
- * *Idechthis mimicus* Vier. Georgetown, Ont.

The above species described in Trans. Royal Soc. Can., Sec. V, 1926.

- * *Syzeuctus sigmoidalis* Cush. Godbout, Que., (E. M. Walker). Proc. U.S. Nat. Mus., Vol. 67, 1926.

Calliceratidae

- * *Aparamesius nigriclavis* Fouts. Toronto, Ont., (H. S. Parish). Proc. Ent. Soc. Wash., Vol. 28, No. 8, 1926.

Megachilidae

- * *Anthidium tenuiflorae yukonense* Cockrl. Carcross, Yukon Territory, (W. P. Cockerell). Ann. Mag. Nat. Hist., XVIII, No. 108, 1926.

Apidae

- * *Bremus rufocinctus sladeni* Frison. Ottawa, Ont., (F. W. L. Sladen).
- * *Bremus pleuralis clarus* Frison. Fort Wringley, N.W.T., (C. H. Crickmay). Laggan, B.C.

The above two races described in Trans. Am. Ent. Soc., Vol. LII, No. 2, 1926.

Hemiptera

Coreidae

Leptoglossus fulvicornis Westw. Jordan, Ont., 30, VI, 17. (W. A. Ross).
Chelinidea vittiger Uhl. Medicine Hat, Alta., 2 V, 25, (F. S. Carr). on cactus. (The Quebec record of Provancher is considered doubtful.)

Lygaeidae

Oncopeltus fasciatus Dall. Caradoc, Ont., 15, VIII, 21, (H. F. Hudson).

Phymatidae

Phymata vicina Handl. Aweme, Man., 8, VII, 24, (N. Criddle).

Cercopidae

Lepyronia gibbosa Ball. Aweme, Man., 14, VIII, 24, (R. D. Bird).

Ephemeroptera

The following list prepared by G. S. Walley, under the direction of Dr. McDunnough, brings the known distribution of Canadian species up to date.

Ephemeridae

Ephoron (Polymitarcys) leukon Will. Kirk's Ferry, Que.
Hexagenia recurvata Morgan. Sand Lake, Ont.
Hexagenia atrocaudata McD. Lyn, Ont.
Hexagenia viridescens Wlk. Severn, Ont.
Hexagenia limbata var. *occulta* Walk. Wendigo Bay, Lake Nipigon, Ont. Former references to *limbata* Guer. should come under this heading.
Hexagenia affiliata McD. Sparrow Lake, Severn, Ottawa, Kingston, Algonquin Park, Ont.
Ephemera simulans Wlk. Pt. Pelee, Normandale, Ont.
Neoephemera bicolor McD. Laprairie, Que.
Potamanthus verticis Say. (*flaveola* Walsh). Niagara Falls, Bothwell, Ont.

Baetidae

Leptophlebia mollis Eaton. Kearney, Burk's Falls, Orillia, Ont.
Leptophlebia pallipes Hagen. Seton Lake, Lillooet, B.C.
**Leptophlebia temporalis* McD. Alta Lake, Mons, B.C.
Leptophlebia guttata McD. Burk's Falls, Jordan, Ont.
Leptophlebia moerens McD. St. Davids, Putnam, Bothwell, Ont.
Leptophlebia debilis Wlk. (*separata* Ulm.) Kearney, Ont.; Seton Lake, Lillooet, Agassiz, B.C.
**Leptophlebia bicornuta* McD. Bearberry Creek, near Sundre, Alta.; Shawnigan Lake, Vancouver Island, B.C.
Leptophlebia johnsoni McD. Kearney, Sand Lake, Ont.
**Leptophlebia ontario* McD. Jordan, Ball's Falls, Ont.
Leptophlebia rufivenosa Eaton. Goldstream, B.C.
**Leptophlebia invalida* McD. Departure Bay, B.C.
Blasturus cupidus Say. Sand Lake, Chatham, Bothwell, Ont.
Blasturus nebulosus Wlk. Kearney, Orillia, Bothwell, Ont.
Choroterpes basalis Banks. Lyn, Muskoka, Ont.
Habrophlebiodes americana Banks (*betteni* Need.) Centreville, Ont.
**Ephemerella flavilinea* McD. Waterton, B.C.
Ephemerella needhami McD. Laprairie, Lachine, Que.; Prescott, Ont.
Ephemerella tibialis McD. Slave Lake, Alta.
**Ephemerella inflata* McD. Wakefield, Que.
Ephemerella simplex McD. St. Annes, Lachine, Que.; Prescott, Niagara Glen, Normandale, Ont.
Ephemerella attenuata McD. Laprairie, Que.; Deadman's Creek, B.C.
Ephemerella funeralis McD. Kearney, Sand Lake, Ont.
**Ephemerella coxalis* McD. Dorval, Lachine, Coteau-du-lac, St. Annes, Beauharnois, Chateauguay, Que.; Kearney, Fisher's Glen, Ont.
Ephemerella inermis Eaton. Shuswap Lake, Penticton, B.C.
**Ephemerella semiflava* McD. Tillsonburg, Ont.
Ephemerella infrequens McD. Seton Lake, Lillooet, B.C.
Caenis hilaris Say. Ottawa, Ont.
Baetis bicaudatus Dodds. Seton Lake, Lillooet, B.C.
Baetis intermedius Dodds. Barkerville, Seton Lake, Lillooet, B.C.
Baetis parallela Banks. Medicine Hat, Alta.; Oliver, B.C.
Baetis moffatti Dodds. Barkerville, B.C.
Baetis vagans McD. Ottawa, Ont.
Baetis incertans McD. Orillia, Putnam, Ont.
Baetis brunneicolor McD. Ottawa, Fisher's Glen, Normandale, Walsh, Ont.
Baetis cingulatus McD. Orillia, Ont.
Baetis pallidula McD. Tillsonburg, Ont.
Baetis levitans McD. Orillia, Ont.
Baetis pluto McD. Lyn, Ont.
Baetis rusticans McD. Wakefield, Que.; Algonquin Park, Orillia, Ont.
Baetis parvus Dodds. Covey Hill, Hull, Que.; Orillia, Ball's Falls, Bothwell, Ont.; Alta Lake, Mons, Oliver, B.C.
**Baetis akataleptos* McD. Medicine Hat, Alta.
Baetis pygmaea Hag. Lachine, Que.; Orillia, Niagara Falls, Walsh, Put-in-Bay, Ont.
Baetis frondalis McD. Laprairie, Lachine, St. Annes, Hull, Que.; Algonquin, Brockville, Jordan, Ball's Falls, Pt. Bruce, Ont.
Baetis spinosus McD. Wakefield, Que.; Kearney, Burk's Falls, Walsh, Normandale, Pt. Bruce, Ont.; Darlingford, Aweme, Man.
**Baetis insignificans* McD. Seton Lake, Lillooet, B.C.
Baetis frivolus McD. Wakefield, Aylmer, Que.; Ottawa, Burk's Falls, Ont.
Heterocloeon curiosum McD. Laprairie, Que.; Niagara Falls, Ont.
Pseudocleon carolina Banks. Orillia, Ont.
Pseudocloeon virilis McD. Lachine, Vaudreuil, Que.; Niagara Falls, Putnam, Ont.
Pseudocloeon chlorops McD. Lachine, Que.
Pseudocloeon punctiventris McD. Laprairie, Lachine, Que.
Centroptilum fragile McD. Laprairie, Lachine, Que.; Cornwall, Ont.
Centroptilum ozburni McD. Lachine, Que.; Burk's Falls, Walsh, Normandale, Delhi, Ont.
Centroptilum bellum McD. Lachine, Que.; Jordan, Ball's Falls, Ont.
Centroptilum caliginosum McD. Lachine, Que.
**Centroptilum semirufum* McD. Kearney, Ont.
**Centroptilum album* McD. St. Annes, Que.; Orillia, Ont.
Cloeon implicatum McD. Waterton Lakes, Alta., Vernon, B.C.
**Cloeon minor* McD. Joe Lake, Algonquin Park, Ont.
Cloeon simplex McD. Laprairie, Lachine, Wakefield, Que.; Ottawa, Severn, Ont.
Cloeon insignificans McD. Ottawa, Ont.
Cloeon rubropicta McD. Laprairie, Lachine, Que.; Cornwall, Severn, Lake Muskoka, Niagara Falls, Walsh, Delhi, Ont.

Baetidae—*Continued.*

Callibaetis fluctuans Walsh. Fisher's Glen, Ont.
Callibaetis ferruginea Walsh. Putnam, Ont.
Callibaetis americanus Banks. Putnam, Ont.; Cypress Hills, Alta.
Isonychia bicolor Wlk. Niagara Falls, Ont.
Ameletus ludens Needh. Orillia, Ont.
Ameletus velox Dodds. Banff, Alta.; Barkerville, B.C.
Ameletus vernalis McD. Seton Lake, Lillooet, B.C.
Siphlonurus rapidus McD. Kearney, Orillia, Ont.
Siphlonurus bernice McD. Hopedale, Labrador; Kearney, Sand Lake, Burk's Falls, Ont.
Siphlonurus alternatus Say. Laprairie, Dorval, Que.; Burk's Falls, Ont.; Slave Lake, Alta.
Siphlonurus columbianus McD. Alta Lake, Mons, Agassiz, B.C.
**Siphlonurus securifer* McD. Algonquin Park, Ont.

Heptageniidae

Iron longimanus Eaton. Alta Lake, Mons, Seton Lake, Lillooet, B.C.
Iron pleuralis Banks. Scotch Lake, N.B.
Iron grandis McD. Seton Lake, Lillooet, B.C.
Iron suffusus McD. Vaudreuil, Laprairie, Dorval, Aylmer, Hull, Que.; Prescott, Ont.
Iron punctatus McD. Laprairie, Hull, Que.; Ottawa, Ont.
Iron deceptiva McD. Banff, Alta.; Barkerville, B.C.
Cinygma mimus Eaton. Alta Lake, Mons, B.C.
Cinygma ramaleyi Dodds. Mt. Cheam, Barkerville, B.C.
Cinygma hyalina McD. Seton Lake, Lillooet, Barkerville, B.C.
Cinygma bipunctata McD. Kearney, Ont.
Cinygma integrum Eaton. Alta Lake, Mons, B.C.
Anepeorus rusticus McD. Saskatoon, Sask.
Ecdyonurus frontalis Banks. Aylmer, Kirk's Ferry, Que.; Kearney, Severn, Lake Muskoka, Ont.
Ecdyonurus interpunctatus Say. (*flaveola* Pict.). Caradoc, Orillia, Niagara Falls, Queenston, Put in Bay, Normandale, Delhi, Pt. Bruce, Bothwell, Chatham, Pt. Pelee, Ont.
Ecdyonurus canadensis Wlk. Laprairie, Lachine, St. Annes, Chateauguay, Dorval, Que.; Prescott, Kingston, Orillia, Lake of Bays, Sand Lake, Kearney, Ont.
Ecdyonurus tripunctatus Banks. Anticosti Isd.; Laprairie, Chateauguay, Que.; Lyn, Orillia, Lake Muskoka, Kearney, Sand Lake, Jordan, Ball's Falls, Fisher's Glen, Normandale, Pt. Pelee, Ont.
Ecdyonurus vicarius Wlk. Macinquac, N.B.; Lachine, Que.; Kearney, Bothwell, Ont.
Ecdyonurus rubromaculatus Clem. Severn, Ont.
Ecdyonurus integer McD. Aylmer, Hull, Wakefield, Kirk's Ferry, Que.; Ottawa, Severn, Ont.
Ecdyonurus pulchella Walsh. Niagara Falls, Normandale, Tillsonburg, Ont.
**Ecdyonurus mediopunctatus* McD. Walsh, Victoria Harbour, Ont.
**Ecdyonurus bipunctatus* McD. Niagara Falls, Queenston, Cayuga, Normandale, Fisher's Glen, Bothwell, Pt. Pelee, Ont.
**Ecdyonurus ruber* McD. Laprairie, Lachine, Aylmer, Hull, Kirk's Ferry, Que.; Brockville, Ottawa, Burk's Falls, Ont.
Ecdyonurus placita Banks. Laprairie, Lachine, Dorval, Aylmer, Que.; Ottawa, Cornwall, Prescott, Brockville, Ont.
Ecdyonurus terminatus Walsh. Treesbank, Grand Beach, Man ; Waterton Lakes, Alta.
**Heptagenia perfida* McD. Jordan, Ball's Falls, Ont.
**Heptagenia horrida* McD. Jordan, St. Davids, Ont.
Heptagenia marginalis Banks. Laprairie, Kirk's Ferry, Que.
Heptagenia vitrea Wlk. Described from St. Martins Falls—Albany River, Ont., but not yet identified.
Heptagenia elegantula Eaton (*coxalis* Banks, *querula* McD.). Saskatoon, Sask.
Heptagenia solitaria McD. Nicola, Oliver, B.C.
Heptagenia pullus Clem. Lachine, Lanoraie, Que.; Kearney, Ont.
Heptagenia lucidipennis Clem. Laprairie, Lachine, Que.
Heptagenia inconspicua McD. Laprairie, Lachine, Que.; Walsh, Bothwell, Ont.
Heptagenia manifesta Eaton. Laprairie, Lachine, Kirk's Ferry, Que.
**Heptagenia walshi* McD. Walsh, Ont.
Heptagenia minerva McD. Lachine, Chateauguay, Que.; Burk's Falls, Bothwell, Ont.
**Heptagenia aphrodite* McD. Hull, Que.; Ottawa, Ont.
**Rhithrogena doddsi* McD. Waterton Lakes, Alta.
Rhithrogena jejuna Eaton (*fusca* Walk.). Saskatoon, Sask.; Medicine Hat, Alta.; Deadman's Creek, Oliver, B.C.
Rhithrogena impersonata McD. Dorval, Laprairie, Lachine, Montreal, Que.

*Species marked thus are described in Can. Ent., Vol. LVIII, pp. 184-196, 296-303.

ORTHOPTERA

Tryxalinae

Gomphocerus clavatus Thom. Cranbrook, B.C., (E. R. Buckell).

Oedipodinae

Trimerotropis vinculata Scud. Riding Mountain, Man., July, (E. Criddle).
Trimerotropis azurensis Brun. Drumheller, Alta., (Criddle and King).

Acrididae

Aeoloplus turnbulli Thom. Drumheller, Alta., (Criddle and King). Cypress and Minda, Alta., (Strickland).
Melanoplus flavidus Scud. Drumheller, Alta., (King).

Tettigoniidae

Conocephalus fasceatus De G. Gull Lake, Sask., (King).

INDEX

	PAGE
Aedes hirsuteron Theo	9, 14
" *vexans* Mgn	9, 16
Anopheles	16
Apanteles	22
Aphis brassicae	41
" *pseudobrassicae* Davis	41
Apple sucker	21
Armyworm	22
Balaninus caryae Horn	9
" *obtusus* Blanchard	9
" *proboscidus* Fab	9
" *quercus* Horn	9
" *rectus* Say	9
Brown-tail moth	21
Cabbage aphis	41
" maggot	8
Case-making clothes moth	9
Cat flea	9
Cirphis unipuncta Haw	22
Colorado potato beetle	8
Corethra cinctipes Coq	17
Corn ear worm	42
Ctenocephalus felis Bouche	9
Currant fruit fly	38
Depressaria heracliana DeG	8
Diamond-back moth	8
Epochra canadensis Loew	38
European corn borer	7, 21, 24, 28, 33, 35
" pine shoot moth	22
Exeristes roborator	22
Four-lined plant bug	8
Gracilaria syringella Fab	8
Grasshoppers	8
Gypsy moth	21
Habrobracon brevicornis	22
Heliothis obsoleta	42
Hippodamia convergens	43
House flies	9
Hylemyia antiqua Meig	8
" *brassicae* Bouche	8
Imported cabbage worm	8
Ladybird beetles	43
Leptinotarsa decemlineata Say	8
Lilac leaf miner	8
Lygus pratensis L	8, 44
Malacosoma americana Fab	8
" *disstria* Hb	8
Maple leaf cutter	8
Melanoplus bivittatus Say	8
" *femur rubrum* DeG	8
Mexican bean beetle	22
Microgaster	22
Mosquitoes	9, 12
Musca domestica	9
Mushroom mite	17
Oberea bimaculata Oliv	8
Onion maggot	8
Paleacrita vernata Peck	8
Paraclemensia acerifoliella Fitch	8
Parsnip webworm	8
Pieris rapae L	8
Plutella maculipennis Curt	8
Poecilocapsus lineatus Fab	8
Pyrausta nubilalis Hubn	7
Raspberry cane borer	8
Slugs	8
Spring cankerworm	8
Tarnished plant bug	8, 44
Tent caterpillars	8
Tinea pellionella L	9
Tineola bisselliella Hum	9
Trichogramma minuta	34
Turnip aphid	41
Tyroglyphus farinae De Geer	17
" *lintneri* Osb	17
Webbing clothes moth	9

Ontario Department of Agriculture

FIFTY-EIGHTH ANNUAL REPORT

OF THE

Fruit Growers' Association

OF

ONTARIO

1926

PRINTED BY ORDER OF

HON. J. S. MARTIN, *Minister of Agriculture*

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

CONTENTS

PAGE

Officers and Committees for 1927 4

Financial Statement 4

Annual Meeting:

Review of the Year:

Hardy Fruits: H. Sirett 5

Tender Fruits: Jas. Marlowe 6

Tomato Growing as an Intercrop: Prof. A. H. MacLennan 7

Round Table Conference on Varieties, in charge of E. F. Palmer 15

Peaches: Walter C. Fisher 15

Pears: Col. H. L. Roberts 19

Cherries: Geo. A. Robertson 21

Apples: W. L. Smith 21

Varieties Recommended 21

Report, Tariff Committee 25

Report of Historical Committee 27

Activities of Canadian Horticultural Council, 1926: E. B. Luke 28

Recent Changes in the Fruit Act: G. E. McIntosh 34

Grape Varieties: F. E. Gladwin 36

Some Effects of Spray Materials on Fruit and Fruit Trees: W. C. Dutton 39

Grape Cultural Problems: F. E. Gladwin 49

Report of the Transportation Committee 54

Round Table Conference on Small Fruits, in charge of W. T. Macoun 55

Raspberries: Ed. Louden 56

Currants and Gooseberries: Paul A. Fisher 58

Strawberries: W. M. Fletcher 61

Some Aspects of Spraying Management: W. C. Dutton 62

Toronto Market for Ontario Fruits: W. J. McCart 71

Report of Resolutions Committee 75

Fall Spraying of Peach Trees: E. F. Palmer 78

Round Table Conference on Spraying, in charge of Dr. G. H. Berkeley 79

The Oriental Peach Moth: W. A. Ross 79

Spray Materials and Spraying Operations: Prof. L. Caesar 81

Appendix:

Representation for Ontario Fruit Growers in England: W. B. Somerset 85

Fruit Growers' Association of Ontario

OFFICERS FOR 1927

Honorary President	H. SIRETT, Brighton.
President	H. T. FOSTER, Burlington.
Vice-President	G. H. MITCHELL, Clarksburg.
Secretary-Treasurer	P. W. HODGETTS, Toronto.
Executive Committee	The above officers, together with MESSRS. HAMILTON FLEMING, Grimsby; J. SCHUYLER, Simcoe; and H. L. ROBERTS, Grimsby.
Auditor	F. P. JOHNSTON, Toronto.

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2. E. H. MARTYN, Port Hope.
W. E. HARE, Cobourg.
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Canadian National: W. F. W. FISHER, Burlington.
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Ottawa: W. T. MACOUN, Ottawa.
Royal Winter Fair: FRED WATSON, R.R. 1, Port Credit; COLIN SMITH, Burlington; GEORGE WILSON, Simcoe.

COMMITTEES.

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Horticultural Council: COL. H. L. ROBERTS, Grimsby.
New Fruits: W. T. MACOUN, E. F. PALMER, A. H. MACLENNAN.

Historical: W. H. BUNTING, St. Catharines; W. T. MACOUN, Ottawa.
Resolutions: H. SIRETT, HAMILTON FLEMING, J. H. PINCHIN, GEO. WILSON.

FINANCIAL STATEMENT, 1926

RECEIPTS.

Balance on hand, Dec. 31st, 1925	$1,795 07
Membership Fees	314 75
Government Grant	1,700 00
Interest on Deposits	28 84
Insurance and Freight	119 99
	$3,958 65

EXPENDITURES.

Annual Meetings	$879 11
Committee Meetings	221 85
Periodicals (Can. Hort. Pub. Co.)	379 49
Imperial Fruit Show—Fees	9 00
Advance and Bond—W. B. Somerset	525 00
Freight and Insurance (Overseas Shipments)	446 50
Royal Winter Fair (Special Prizes)	230 00
Miscellaneous	135 04
Balance on hand, Dec. 31st, 1926	1,132 66
	$3,958 65

Fruit Growers' Association of Ontario

ANNUAL MEETING

The Sixty-Seventh Annual Convention of the Ontario Fruit Growers' Association was held at the Royal Connaught Hotel, Hamilton, on February 23rd, 24th, and 25th, 1927. The President, H. Sirett, occupied the chair.

REVIEW OF THE YEAR

HARDY FRUITS—H. SIRETT, Brighton, President O.F.G.A.

In my "Review of the Past Season," I shall confine myself to the experiences of the apple grower. It is quite noticeable each season that the individual grower reacts to his experience of the preceding season or seasons. If he has had a successful season he enters the new year full of optimism. If his results have been unsatisfactory from reasons which he cannot regard as being due to his own fault of judgment or performance, then the grower is quite apt to be correspondingly pessimistic. The season of 1925 was a trying one to apple growers in all parts of Ontario. The disastrous freeze in late October destroyed a considerable part of the apple crop and seriously damaged a great deal of fruit which was picked but still in the orchards. Those districts which packed and shipped directly from the orchards did not suffer so severely, and as their fruit was marketed early, they received the better prices prevailing early in the season. Other districts, particularly in Eastern Ontario, which store a great deal of their crop, to be repacked and marketed during the winter, experienced a disastrous season. Their fruit showed a great deal of frost damage and there was an unprecedented development of fungus growths on the fruit in storage. Markets returned only ruinous prices. Growers and dealers both suffered severe losses.

It was not surprising, therefore, to find in the beginning of 1926, in many sections of Ontario, a great lack of optimism among apple growers. The crop of 1925 was a heavy one and there was little prospect of a second large crop in 1926, and there was a very decided falling off in the amount of work and care given to orchards.

The opening prices for fruit at the beginning of the marketing season only served to further justify the pessimism of growers. Prices offered did not cover the cost of production save on a few of the choicer varieties which unfortunately were yielding only a very small crop. The large crop and low prices prevailing in the United States did not encourage holding fruit for later marketing, so that the crop from many orchards was sold at low prices.

I now turn to later developments; the British market, which had been very unattractive up to the end of the year, has since given some very satisfactory returns. The Ontario crop, which had been estimated at two-thirds of the crop of 1925, proved to be much smaller than estimated. The operation of the Dumping Act against the import of cheap American apples apparently helped,

and since the New Year the tone of the home market has much improved. Those who were holding apples in storage are realizing better prices than were obtainable earlier in the season and much better than a year ago. It is to be hoped that these better returns will help to renew hopefulness and encourage growers to incur the expense of better cultural methods in 1927.

The effects of the trying seasons of 1925 and 1926 are already apparent. Growers' are showing that they realize that more attention must be given to the quality of product. Grade and variety must be both considered. Even the No. 1 and No. 2 grades of many varieties have not returned prices to cover cost of production. Growers in many cases are cutting out the trees of the most undesirable sorts. Others are planning to top-work poor varieties with more marketable kinds. This, with the number of poorer orchards which will be neglected, will have an effect on the volume of production and tend to relieve the markets of much inferior fruit.

A great deal could be said of marketing methods but time does not permit. Better growing will always be the first step toward better grading and better marketing. It is also true that better marketing must go hand in hand with better growing if the follower of the best cultural practices is to receive the full financial benefit of his effort.

The Ontario apple grower has no justification for being discouraged. We are blessed with soil and climatic conditions, which when combined with good cultural methods, produce fruit that for flavour, crispness and tenderness of flesh, is not excelled by apples grown anywhere else on earth.

The Ontario apple grower needs to take advantage of his opportunities. He must strive to provide himself with the most suitable varieties and he must grow these to the greatest degree of perfection possible. His greatest competition is coming from other districts which are excelling in colour of fruit, uniformity of grading, desirability of package and marketing enterprise.

He has a great advantage in having a large home market and in being nearer to the British market. The course we should pursue seems absolutely clear. It remains but to decide upon the steps necessary to carry us forward.

TENDER FRUITS—JAS. MARLOWE, Grimsby, President N.P.F.G.A.

I feel deeply impressed with the truth of Solomon's affirmation that "there is nothing new under the sun," and after knowing that my predecessors for years past have performed this task, you will understand what is left to be said by me. The tender fruit situation is much better than it was in 1925. Our berry crop this year was all that could be desired, with fair prices. The sweet cherry crop suffered from the heavy rains in July and we lost a great deal of our Windsor cherries from splitting and the brown rot setting in. Unfortunately, the bottom fell out of prices for the plum crop. It is just possible that plums may be over-planted, and if such is the case we have got to replace plums with some other tender fruits. They can grow plums all over the Province of Ontario, perhaps as good as we can here in the Niagara Peninsula, but there are a great many things they cannot grow in the other sections of the Province of Ontario that we can grow in the Niagara Peninsula, and I believe our salvation will be to grow the more tender fruits that they cannot produce in other places. The grape crop was good. Of course it came in very late; we thought for a time our grapes were going to be frozen, but finally the grapes ripened up and we got good prices. I hope that the thirsty public got what they required, which I believe they did

TOMATO GROWING AS AN INTERCROP

PROF. A. H. MACLENNAN, O.A.C., Guelph

Mr. Sirett said the tomato was a vegetable. If you want the legal and botanical term, it is a fruit; so we cannot get out of it in that regard, although commercially it has been classed as a vegetable. In regard to the question on the programme, I don't know whether they meant me to talk of it from the standpoint of using it as an interplant or whether they meant it as a crop you wanted to make some money out of. My own idea when I was talking to the Secretary, Mr. Hodgetts, was that you wanted it from the cash standpoint.

To my mind, in tomato growing—and I have been following it now about eighteen years steadily, not only here in Ontario but in the United States—the crop naturally divides itself into a number of sections, the chief one being the early crop and the second one being the canning factory crop. I don't know whether I am right in my idea that you folks are after the early crop, especially those of you in the Niagara Peninsula, rather than too much of the canning factory crop. I have always separated them because my training along that line had led me to the belief that while you can sell the tail end of your crop to the canning factory, still it is distinctly different in its handling to the early grown tomato.

In growing tomatoes for the early market the first thing I always think about more than any other is the question of getting plants that will produce as early fruit as possible. Now, that work depends largely on the type of plant that you put out. A good many growers in growing tomatoes for the early market carry at least the first set of fruit on the plants and in some cases the second set; if they are handled properly you can carry the first two sets fairly well. The biggest difficulty I have found is fruits dropping, or blossoms dropping which is really more the case than the fruits themselves, which usually follows a check in transplanting. I have found it a good idea if you can work it so, that the less blossoms you have upon the plant you are transplanting, the less tendency there will be for loss at that time.

Now, getting back to the question of the production of the plants that you will use; the size of plant, of course, varies. The best plant being one that is rather stocky, not too long, and is dark green with a tendency towards purple shading, indicating that the plant is in perfectly healthy condition; although I have seen some of the earliest crops grown in the Province of Ontario produced from plants when the leaves were yellow, a very bright yellow. I know one man in this province who for the last number of years has never produced any other type of plant but that one with yellow leaves and that man produces the first fruit on the market, but while he may have success in that line my own experience over various sections has lead me to believe—and my own experience in growing them—that the plant that has the green colouration, the dark, purplish green colouration, will give you the better results in the end.

The next question is the number of times of transplanting. That matter depends on the time that you can afford to put into it. Transplanting does one thing to the plant and that is by cutting the root system and forcing it to produce a larger number of small fibrous root, naturally that increases the feeding area of the plant and when that plant finally reaches its last resting place, if we might call it that, it will be healthy and grow to much greater satisfaction, but then there is a limitation in two ways to the number of transplantings. Firstly, the amount of time that you can afford to put into it, because it costs money;

each transplanting costs an extra amount of money. Secondly, the more transplanting you give the longer period you will have to give between the sowing of the seed and the setting of the plant in the field. In other words, if you give four transplantings you would need to start at a period of about twelve weeks before in order to get the full size plant that you desired. That is, unless you desired to hurry the plant along. You can do it, but you will hurry the plant along with the result that you will have it a softer plant. Each transplanting lessens the time about two weeks, sometime three. We generally sow our seed at home about the 25th of this month, sometimes a little earlier. .We are just sowing it at the present time. We plant seventy to eighty to the flat. The flat is 23 x 12 x 3 inches thick. The ordinary flat is just as large as a finnan-haddie box that you can quite frequently pick up at the grocery store, and I might say this: if you can get them at anything like a decent price they are the best type of flat that you can get anywhere, because the man who invented them apparently meant them for flats after they got through carrying fish and, of course, the fishy smell does not hurt the tomatoes any. At home we make our own, using the cheapest grade spruce lumber that we can get. In some districts in Ontario they use a flat which is slightly deeper than I use. That is, in the Leamington district they run to a flat four inches deep rather than three, which we use. My own idea of it is they do not gain sufficiently from that to help them out, although one man I know uses them and he claims he does get results out of them. Of course, that is largely a question for you to satisfy for yourself. If you think your plants have not sufficient food there in which to grow, you will have to make them larger; but for one thing it is a heavier box to handle and is therefore slightly more awkward.

We make our first transplanting when the plants are beginning to show their first true leaf; in many cases it is hardly to be seen. I just want to go back for a moment to the matter of your seedling. To my mind you can frequently cause yourself a good deal of trouble through growing seedlings that are poor in quality. We sow the seedlings in rows about an inch and a half apart and we sow the seed about three-sixteenths of an inch deep, in fact we just pack the soil down on top. By the way, there is another thing I want to mention, and that is in putting the earth into your flats be careful to pack down the soil well at the corners and to a certain extent along the side of the box. You will find if you do not there will be a tendency for the earth at the sides to sink and instead of having a perfectly level surface you will have one side high and the other low and that will give you trouble because the low side will be wet and the upper side will be perfectly dry at one and the same time.

Now, in sowing the seed we usually sow a great deal more thickly than probably you do. We sow from twenty to twenty-five seeds to the inch. The ordinary sowing with a great many people is ten seeds to the inch. There is rather an interesting factor that probably has never occurred to you, and that is that seeds in germinating and plants in growing develop a certain amount of electric current. If you desire to know just what will happen in a flat growing tomato plants, if you put a zinc plate at one end of the flat and a copper plate at the other end and connect them with an overhead wire and attach the wire to a volt-metre, you will find a distinct current going through. Sometimes for fun with the boys we get them to plant thickly and thinly, put them in the same day, and in every case you will find, if you want to try it yourself, that the thickly sown seed will come much more quicker, in fact so quickly that your thickly sown seed will be ready for transplanting before the other is much more than out of the ground. That is all due to the fact that in that thickly sown

seed you are germinating electricity. There is another point that enters there and that is the heat at which you keep them; we find that if you want the seeds to germinate properly you must carry them at a fairly high temperature. They will germinate at a little lower temperature than what you would suppose, but your percentage of germination will be much lower. I like to get them somewhere at least around seventy and I find that at that point, and even up to seventy-five, they will grow much better, you will get a larger germination and you will also get a seedling plant that is much stronger. There is another point there that you might find worthy of mention, and that is that the soil that you use for this seed sowing can be very poor as far as fertilization value is concerned without any loss to the plant. You must remember that your young seedling plants are not going to remain any length of time in that soil; all they need is something to keep the moisture around them until they germinate and in most cases there is enough food in the seed, with what water they can gather, to produce the plant to the size you want. Water and heat will give you the size of plant from the seed itself without figuring on anything coming from the soil.

We transplant from the seedling flat when the young plants are just beginning to show the first leaves, the narrow slender leaves, one on each side coming out of the main stem. In the first transplanting we have about eighty to the flat; that is, the plants are about an inch and a quarter apart each way. Eighty to the flat will take up a good deal less space in the hot-bed or green-house. Our next transplanting is about twenty-four. We skip the fifty stage, we skip down from eighty to twenty-four. My idea has been for two transplantings; I figure that is sufficient. You might get away with one and you might go to four transplantings, that is up to yourself. Each transplanting, as I say, requires a little longer time, but it gives you a better root system.

Now, in helping the young plant along, I might say from your first transplanting on, good soil is necessary. That does not mean exceptionally rich soil, exceptionally rich in nitrogen; that is a very objectionable feature in the soil, but it does mean soil that has plenty of fibre, where the tomato plant roots can work away and spread themselves according to the way they desire. Excess nitrogen at this time will give you a growth that will be hard to handle; it will be soft and leggy and in time it will develop, especially if they get much water, into the yellowy dark colour, instead of the dark purplish green. Getting on, you come to the point that you have developed a plant that is stocky and has a large fibrous root system. You can, if you want, go along and skip out one transplanting. Supposing you wanted to give them the one transplanting before the final one into the fields, suppose you want to put about thirty in the flat; you can, to a large extent accomplish the same thing as transplanting by taking a knife and cutting each way around the plant, doing that about every week or so you will get the same result as transplanting. This system is used in the United States and is known as "blocking."

From that section of the work you come to the point of the last transplanting, whether you will put them eight—which is the common number—in a flat or whether you will grow them in berry baskets, that is, the ordinary quart basket, or whether you will use the veneer bands or paper bands or whether you will use the pots. I know men not only in Ontario but in the United States who swear by one or other method, but my personal belief is the results are the same. One man in Ontario, in the Leamington district, grows his plants in rather a peculiar form. He puts them eight in a flat but instead of putting them upright he puts them at an angle. That is, he starts at the end of the flat and lays in two plants, instead of setting them upright as you or I would, he puts them sideways, and

then he lays his next two over that way and so on. He claims that when he is ready to plant them in the field, he can move these plants out without disturbing the root system in the slightest. Now, you can use that method if you like; I am not recommending one definite method to do for everybody. My own idea has always been that a plant grown in such a method that you can remove it from the receptacle without disturbing the root system in the slightest, that plant will give you the best results in the field, and if it is carrying blossoms even fully open, if there is any moisture at all in the soil where you are putting them, there is very little chance of that plant dropping its blossoms.

There is another point that comes in there besides that question of not disturbing the root system the last time, when you are setting them in the field, and that is in regard to hardening. But before I get to that I just want to say this to any of you who use bands, that is either the veneer bands or the paper bands, that if you are setting them anywhere on soil it is advisable to put between the soil and the plant a layer of paper. If you don't, you defeat the thing you are working on from the start because that plant will just as naturally as anything dive down in the soil, and of course when you remove it you break the root system. Coming to the hardening of the plant, you have been carrying that plant along under ideal conditions. You have given it everything that it desires. Now you are going to put it out in the field where to a large extent it is at the vagaries of the weather. Now, a plant that is light in root system, that has been over-watered or is soft, will be affected immediately by the change in conditions. Between the time of your last transplanting in the hot-bed or green-house, between that time and the time you put them in the field, is the time that you should harden your plant. I might say that from my own personal standpoint I have carried on for quite a number of years different practices in regard to hardening. I have put them out in the cold rains and watered them carefully; I have left others in the green-house and watered a whole lot more carefully; I have had other men do the same thing with regard to their plants. In every case I have found that the plant that is kept in any condition, whether it is warm or cold, if you hold down the supply of water to the minimum, in other words, if you leave that plant to dry out almost to the point where it will begin to wilt, that plant will in every case stand frost. I have seen it on more than one occasion that the plants that were hardened outside were put alongside plants that were hardened in the green-house and where one plant was watered outside and one was watered inside, the one that had the least water always came through the best. In other words, it is not a question of air hardening as we have been doing in a good many cases, it is a question of water hardening. You will find it all the way through that the water hardened plant, that is, the one you keep away from the water, that plant will stand colder conditions when it goes outside with a good deal less percentage of injury than one that has been hardened in the ordinary way.

Now, your plants are set out in the field at varying times; it may be the 15th May, it may be the 20th of May. I remember years ago our planting day at Guelph used to be the 5th of June, but for the last four years our planting day has been the 24th of May. I don't know whether I am just lucky or the weather has changed or whether it is the condition we grow them in, but apparently we have been free to a large extent of the frost we formerly had at that time.

Then we come to the division of the early crops. The ordinary planting of early tomatoes is three by two and a half of the Earliannas, you might go to three by three in Bonnie Best. I have grown Bonnie Best where six feet was not sufficient to keep track of them but that was when we were growing

them entirely for catsup. There is another method that has become very popular in Ontario the last few years, and that is the staking of tomatoes. It is rather interesting to me because I grew the first staked tomatoes here in Ontario back in 1911; it is not my idea, I don't claim the credit for anything. In the Marriot Valley in Ohio they grow about ten thousand acres on stakes and I was rather interested last fall to see at Boston large areas being grown on stakes. Now, as to the distance of staking, that depends to a large extent, or to a certain extent, on varieties and to a certain condition on your land, and also I may say to the number of plants that you can afford to grow. The common distance back through the United States is two feet apart each way. The common method, I know, is of planting two or three feet rows, two feet apart each way, then a skip of three feet and then another two or three rows. That is to make easy picking. In many cases they can plant them even closer, especially if they figure on mulching. The closer you put them the greater tendency, unless there is a lot of water in the soil, there will be towards smaller tomatoes. Taking the larger varieties you can plant them closer than the smaller type. I don't know how you do planting for early work but in most cases I have followed this method, that is, taking the plow, plow out your distance, mark where you are going to put in your plant and then set your plant in that furrow. Take a plant that you have grown carefully and has fruit on it and you don't want to disturb the root system, I doubt if there is any system that will give you less trouble with your plants than that method of plowing and then coming along with a garden rake and filling in the soil around the plant. Your cultivation later on will fill in the remainder.

The next problem is the fertilizer; that is, the fertility of your soil in growing early tomatoes. I think you will find that what you are after is a plant that will grow quickly and then will stop to a large extent its growth and produce fruit. My idea in the matter has been that a plant should, five weeks after it is set in the field, be large enough that it should spend all its time in the growing of the fruit. Now, that means one thing, that you must have a fair amount of quickly available nitrogen in order to produce that type of plant and after that it should stop, to a large extent, the growth and the fruit that is set should ripen and begin to enlarge. Now, you will find that if you can get up growth the first five weeks, if you can get something that will stop its growth to a large extent, it will start in to the production of fruit. I carried on for a number of years, when I was working at the Department in Toronto, a series of experiments on fertilizing of tomatoes in many sections of the Province. I might say it was not a college experiment at all, it was carried on the growers' farms in the sections where they make a business of growing tomatoes and with men who were intensely interested in growing early tomatoes. In every case it worked itself down to that problem, that a quickly available nitrogen with a certain amount of more slowly available nitrogen, phosphate of ammonia, and the excess of phosphorous was what gave us the early tomato. I use in some cases blood and then I use a large quantity of phosphorous, practically a five-twelve formula, although it might vary, and the phosphorous in as largely watery-soluble form as you can get. In other words, there are two forms of phosphorous on the market at the present time that fill the requirements; the common acid phosphate sixteen per cent. which is not as quickly available as it might be, although you can obtain it in large quantities, I understand, and obtain it easily and it does work very satisfactory. The other form is one that unfortunately there is not as large a quantity to be obtained, there is only about five thousand tons of it made in a year on this continent, in fact, that is about all there is anywhere; it is a by-

product of the making of baking powder, known as phosphate percipitate, twenty-seven per cent. water soluble to a very large extent. It is very difficult to obtain, however, and is one of the meanest things to handle in the fertilizing line that I know of. The biggest difficulty with it is it is just like baking powder, and the only way I have found of handling it, take the bags lay them on the floor and throw a pail of water on them. Then turn them over and throw another pail on and let them stand.

In looking over a recent work which has been published by Prof. Work of Cornell University, I found that potash is of very little value in tomato growing except in a very few isolated sections of the United States. In all my experimental work I have found that nitrogen and phosphate are the two things needed. A little potash will give you a better carrying fruit but outside of that it will give you no return, as most soils that are carefully handled have sufficient potash to grow the tomatoes.

Another thing I have found is that the tomato does not like lime in close contact with it. So it is advisable not to put lime on the soil immediately before you are going to put a tomato crop on; put something else on.

In growing factory canning tomatoes such as we usually find through the Central States, there was only one fertilizer, phosphorous, that we found of any value. Here we do not got to the extremes that they do in the United States in regard to the fertilizer. The common application is up to a ton per acre. I don't think any of you here will require anything like that. I have never ran in any case higher than 1,800 pounds to the acre. Of course, that is up to yourself but that, I have found, is quite satisfactory in most cases.

Getting to the variety question; for the ordinary type of growing, that is, on the flat, there are two standard varieties that have proven themselves better than any other. One is the Earlianna, the other one is Bonnie Best. Now, Bonnie Best is the next generation from Chalk's Jewel, if you want to call it that, and the next generation from that on is John Baer. They are all three of the same line; one is just a selection out of the other. For staking work we have been using Grand Rapids, which is a cross of the old English variety Comet. That variety is a fairly good size, and works well on stakes. There is another English variety that has been on the market the last few years and that is Kondine Red. We have one which we grew at Guelph for a number of years known as Industry. Industry is something of the same type as Kondine. They are not a round tomato, but rather a flattish type; But back of all variety work there is one thing that is of more value than any variety named and that is the particular strain that you can get. In the summer of 1916, I tested 7,000 different brands of tomatoes; we had them there side by side in the field, five plants of a variety, and I found that in many cases they are repetitions under different names. But the main thing is that your own home-grown seed is of more value in tomato growing than anything you can buy, if you will just do one or two things in that regard. Make up your mind to the type of tomato that suits your conditions. Now, if you look over your patch you will find in that patch, in all probability, one particular plant that suits your conditions in every way, shape and form. If you find it save the first fruits from it for seed, and then next spring put them a little bit apart from the others, don't give them any better treatment, but put them on one side of the field where you will know they are. Watch them during the season and you will find variations in that lot; there will be some there that will be of better quality than the others. Again you save your seed and in three or four years' time you will develop a strain that is absolutely in every way superior to anything you can

buy anywhere. A good deal of the ordinary tomato seed sold on the market is grown in the southern or the southwestern States, and is from the canning factory tomatoes or from the catsup factory, where they use the cold method of handling.

In saving the seed, mark the plant that you want; let the first fruits ripen fully on the plant. Don't let them ripen too much. I have seen fruits allowed to ripen so much that the seed began to grow right in the tomato. Let them ripen fully until they begin to feel slightly soft, then take them in; get a jar of some description, cut the tomato in two and squeeze out the pulp which contains the seed. Put that pulp in a fairly warm situation, the warmer it is the more quickly it will ferment. If it is very warm, or if the weather is very warm, don't be careless about it, watch it very carefully because the seed will sprout right there. Stir it whenever you go by; have a stick near and stir it up. You will find in a very warm day in the summer time, when it is about eighty in the shade, I have seen tomato seeds ferment inside of six hours. When you have got to the point where it looks to be clear when it is stirred, fill it up with water and pour off what you can. You will find the good seed will go to the bottom so that in two or three times you will find your water is clear. Then spread it on something dry; the best thing I have found has been an ordinary wire window screen that you use to keep the flies out of your house. Just put it on that and stir it around as it stands there. Then, when you have done that put that away but not so carefully that you cannot find it the next spring. From the standpoint of earliness there is nothing that will help you more than the selection of your own seed. You will hear men speaking about their particular early strain, and you will find men coming in with very early tomatoes and every one of those men, if you work back to where they came from, have been saving their own seed.

Q.—How do you mix that fertilizer that you found so efficient; you said you made your own, I think?

A.—It really works to 300 pounds nitrate of soda, 400 pounds of blood, and 130 pounds acid phosphate and use 1,800 pounds to the acre.

Q.—You use no barnyard manure?

A.—We have not used any barnyard manure in the last five years. We believe in green manure. Of course, we use barnyard manure, in some places, for our gardens. But we use a combination of peas and oats, put on in the early part of August and it has been found to be better than twenty tons of manure to the acre.

Q.—When do you plough in that green manure?

A.—It depends, of course; take the early stuff, we plant it about the first part of September, and that will be ploughed down in the spring; we don't allow it to grow over fourteen inches. The oats and peas we plough them down before the hard frost starts; we don't want to lose any more than we can help.

Q.—In using the oats and peas in inter-cropping with orchard trees, it might not be desirable as fall planting?

A.—We just use it as circumstances will work out. Now another thing you might be interested in is that we use more rye than anything else. We plant it in the fall and in November it would not even show through the ground, and next spring it will show quite well and be of use for the tomatoes this year. One thing in handling rye, never let it get too high. I have seen rye ploughed down about five or six feet high and that spoils the ground. The rye, we plant about three bushels to the acre.

Q.—I would like to ask Prof. MacLennan about staked tomatoes. How high should you let them grow, how many stems should you have, and when should you prune them off?

A.—Regarding staked tomatoes, I think the general practice wherever they are grown is the single stem. You can grow either two or three stems if you desire it. With the single stems it means more plants but for best results spread over this continent the growers have found the one stem is the only thing that is satisfactory. That is, you leave the one main lead taking off the lateral shoots. In the Marriot District they take four stakes and bring them together at the one point. The plants are set two feet apart each way and then they take the stakes and run them up and form a wigwam. You will have to use more plants but will get more results. I have been in the habit of late years, where we have been growing staked tomatoes, of clipping them off when they get about four and a half or five feet high. That may seem a little strange but what I was after was the ripening of the early fruit and you cannot ripen a large quantity of fruit unless you do.

Q.—Do staked tomatoes ripen earlier than the flat tomatoes?

A.—As far as I have been able to see they do. In most cases, I think you will find they do ripen about a week earlier.

Q.—What about the heat from the soil?

A.—You get more heat, not right immediately at the soil, but a foot up. It is a foot from the soil that you get your highest temperature. Where you get the heat from the soil is at night; the heat that is absorbed in the soil during the day will come off during the night and it will come up; of course, it lessens as it spreads out. I remember in the old days before they thought of staked tomatoes, they put stakes about a foot in the ground and put the laterals over top of it and those were the earliest tomatoes.

Q.—When should you do your mulching?

A.—The time is largely when the plants are about two feet and a half high. The depth depends on your growth entirely, also the depth of your mulching will depend on your pocket book. I would say up about two or three inches. The main idea of the mulch is this: an even distribution of the moisture, the holding of the moisture in the ground so it will go up through the plant. With plants two feet apart you could not possibly cultivate in there with a horse unless you had a small tractor, that would be the only thing you could get through with. There is one thing you have to keep in mind in regard to the cultivation of tomatoes and that is this: the tomato, like the cucumber, keeps its root system close to the surface and if you disturb that root system you disturb the plant.

Mr. Macoun: I would like to mention one or two matters in regard to pruning and staking of tomatoes. I have had occasion to travel across Canada from the Atlantic to the Pacific and I visited a great many farms, and in the Prairie Provinces particularly there are parts of those provinces where it is impossible to ripen tomatoes at all unless they are staked. At our Experimental Farm at Saskatoon, we have carried on experiments in pruning and staking and our reports show that if the tomatoes are left growing on the ground in the prairies there would be practically no ripe fruit at all. And it is worse than that when you go higher in the prairies and you get up into the mountains. We have an experimental farm at Invermere and they find they get the best results by pruning back to one stem a foot or a foot and a half high; they grow them quite close together; showing that there are parts of Canada where it is

impossible to grow any ripe tomatoes at all unless you prune them and stake them.

There is a very interesting article which has appeared in the last few weeks in the *Canadian Horticulturist* by Mr. Walker which bears on the pruning and staking of tomatoes and I am sure Mr. Walker, who is at present at the farm at Ottawa, would be glad to send you a copy if you write him there.

ROUND TABLE CONFERENCE ON VARIETIES

MR. E. F. PALMER: I might say to start with that we have found at other conventions that when a report of the New Fruits Committee comes up we get into pretty much of a round table discussion on varieties, and get pretty much aside from the subject, and that feature more or less prompted the Programme Committee this year to place on the programme a definite place to discuss the question of varieties. Apparently "What variety I shall plant" is a very important consideration from the growers' standpoint, and I think there is no question as to that. It does not matter much what the cultural methods are unless you start out with good varieties, no perfection in cultural methods will give perfection in results. According to the programme we are to deal this afternoon with the tree fruits, peaches, pears, plums, apples and cherries, and one particular grower has been named more or less to start off the discussion with each fruit; so I warn the growers at large here that I shall call on others besides those named on the programme. The first question is that of peach varieties, and I am going to ask Mr. Walter Fisher of Queenston, of the firm of C. Howard Fisher and Sons, to say a word on what variety of peaches he would grow and produce.

PEACHES—MR. WALTER C. FISHER, Queenston

Mr. Palmer was good enough to say I belong to the firm of C. Howard Fisher & Sons, but he has not explained that the only reason I am here instead of my father is because he is away and could not possibly be here. When Mr. Hodgetts wrote he said he would like a discussion on the varieties we grow and some points that we find ourselves concerned with. Mr. Palmer just said he wanted me to say something about some of the varieties I would grow if I were planting again. Now, I cannot promise to tell you all the good varieties, there are several varieties of peaches that I don't known anything about and Mr. Palmer is the best posted man on peaches in this country; so I probably would limit my discussion to a few words that my father and I have found about some of the varieties we grow and why we grow them, and the difficulties we find with some of them and some of the good points.

As you known the chief difficulty in peach growing is to find good varieties which cover the season well. That is, starting in our season around the 1st of August until the 1st of October we should have peaches ripening. It takes several varieties to get that season and what we want is to get a variety to follow each variety in succession as it comes.

We don't grow the Mayflower peach ourselves, that is a white flesh peach, mainly because that comes a little early and comes in before the cherries and some of these other small fruits are out of the way. Those men who are in the peach game alone find they get very good returns from the Mayflower. One

of our neighbours has this peach; he picks it and peddles it around Niagara Falls and St. Catharines and makes money out of that peach every year and he likes it very well.

As far as the first yellow flesh variety goes, we have the June Elberta. There are things to be said for that peach and things against it. Mr. Palmer has found that it is self-sterile. That is probably the biggest drawback to it. It is self-sterile when planted in blocks; it will not fertilize and produce a crop. Just a word about the peach itself, the quality is good. We don't usually expect real good quality in an early peach. But the June Elberta is surprising in that line. It is not real good but it is good for the season and it is not so much of a cling-stone as some that follow after. It is a nice looking peach, a nice mellow colour when it is fully ripened. There is one point there, it is pretty hard to handle if it is allowed to get a little bit ripe on the trees. The trees have to be gone over about three or four times at least within the ten or twelve days of its season.

Along with that peach is another white flesh, Red Bird. I heard somebody say once the man that originated that peach should have been hanged. It is just like some of the pears and apples, like the Ben Davis apple. Here is a point to remember, and that is we should not put something on the market that will spoil the market for something coming later on. I know men that have grown them every year and they find there is a good market. I was in Toronto one day and saw Red Bird peaches on the floor with June Elbertas. The Red Bird are like a rubber ball and just about the same taste, but the commission men were asking the same price and about three to four times the orders for the Red Bird at the same price; because it is so much better colour and when it is packed up well it looks a very nice peach. But if people eat peaches through their eyes and pay the price for them that is their look out.

You all known the old Triumph. Mr. Palmer said to tell you about the varieties I would plant and I won't say very much about that because I don't think Triumph is one of the varieties that he has reckoned in that.

Yellowstone, following on with the yellow peaches around about ten days after the June Elberta and Red Bird, follows the season very well. Possibly most of you are familiar with it so there is no need describing it; but just like the June Elberta, we pick them three or four times. These early peaches ripen fast and you have to pick them about every other day and if you pick every peach off the trees at the right time, I think probably three pickings would do. The Yellowstone does not need as careful handling as some others in that it does not need to be watched as carefully. Every peach has to be handled carefully, as far as that goes, but this one does not have to be watched as closely.

Q.—How is it for bearing? A.—The Yellowstone varies in districts but on the average it is a good prolific bearer.

Then follows the Rochester, a variety that has its drawbacks and also good points. One point about Rochester, it is a prolific bearer. It is a sturdy growing tree, has to be kept under control. It will grow a great lot of wood between four and six years old. Rochester is subject to brown rot, especially in a wet season. The control we use for that is dusting, going over them five times. The rot was comparatively negligible, and you know how hard it was to control brown rot last year. We use the 90-10 dust with ten per cent. lime.

Following the Rochester peach closely, in fact overlapping it, is the Yellow St. John. Somebody was inquiring about the season of the Rochester. This year we picked our first Rochesters on the 31st of August; that is a little bit late for our season and you around Grimsby can figure it out for yourselves, as

we are a little bit earlier than you are. Ordinarily we start picking Rochesters about the 17th to the 20th. The first Yellow St. John were picked on the 8th of September. You all know about the season of the Yellow St. John; they were about one week later. There is no doubt it is about as nice an eating peach as there is, but everybody has got to admit it does not give you the crop. You cannot put peaches on a tree if the blossoms and buds are not there. It comes down to this: that we cannot get the old nursery stock that we used to get. It seems to have run out. We cannot get the hardiness in the trees and the general sturdiness of the trees that we used to get. You can tell the difference between the young Yellow St. John trees planted within the last five or six years and those trees planted fifteen years ago.

Now, a new variety that has come into prominence and one which looks very promising is the South Haven. We have not any bearing yet, but I have seen it in bearing. They appear to be a very fine peach indeed, and one which follows the season very well. The season of 1925, they followed the Rochester pretty closely. South Haven is not a peach to overlook, as far as I can see now. It hangs on the trees and does not soften up to a great extent like some of the earlier varieties.

Following the season you get the Early Crawford, the Reeves and Fitzgerald. I do not think I would continue planting these varieties for the same reason as the St. John that you cannot get the same stock. Take the Jacques Rareripe; we have some old trees, probably seventeen or eighteen years old, and we get wonderful peaches off them; they bear a fair crop every year and are certainly good quality, a nice eating peach and fairly good shipper, but I don't think you could get that same stock from any of the nurserymen to-day. That is not the fault of the nurserymen, as the stock seems to have run out.

Another variety following is J. H. Hale. Somebody has called it the exhibition peach. Everybody knows it is an excellent peach in itself if you can get the fruit. They are a perfect peach but have the same trouble as the June Elberta, being self-sterile. We planted some of them in blocks before this was found out, and had a lot of trouble in getting any crop. The blossom husks were about twice as big as a cherry, but about four-fifths would stop growing and never mature. Now, this sterility problem seems to me to be one that can be solved. This year we have a little personal experience with our Hales. We pulled out half the orchard last year and got some colonies of bees, just as a sort of experiment and also to take care of the cherries. Mr. Robertson will probably tell you, you cannot grow sweet cherries without bees. We had ninety per cent. of these little buds on our Hales and a pretty fair crop. I think bees are well worth looking into where sterility is one of the factors.

Then you end up with the old hardy Elberta; you all know about that peach. If you were to ask me if I would plant it, I would say "yes," it is a peach you can depend on, and a peach that can be shipped to the more distant points. As you know, our retail markets get a little glutted, especially Toronto, and the Elberta is a peach that can be shipped almost anywhere with safety. Then there are the Late Crawford and the Smock, but as I say if I were planting again Elberta is the latest ripening peach I would plant.

MR. E. F. PALMER: Two varieties have been mentioned that are self-sterile, June Elberta and J. H. Hale. June Elberta has a large bloom, which is quite attractive, but J. H. Hale has an inconspicuous bloom, and it is doubtful even where you do interplant with another variety and even where you have bees always around, that J. H. Hale is always going to provide a good crop. You might provide for pollination and then not get it, whereas I think June Elberta would always give you a crop when you provide for cross-pollination.

MR. ONSLOW: I think that the Vineland Station variety, Vaughan, is spoken of very highly for a canning factory peach. It follows the Rochester, between the Rochester and the St. John. Also there is an old variety, the Cowl, which has not been grown very much, but which I have seen in bearing for four seasons. It is a heavy bearer, uniform in size, large, very few small peaches, and comes in a little bit earlier than the St. John. It has been grown in Winona for about twenty-five years but for some reason or other has never been planted to any extent. One thing that we find down in Niagara-on-the-Lake is that the early peaches have been heavily planted for several years, and in another three or four years' time a great many people will wish they had quit planting early peaches. I understand the Crawford has been planted out for the last five years and we are also going to be overplanted on Rochester and St. John. What we want is to get something to fill in the gap between Elberta and St. John and again from Crawford to the end of the year. The last four or five years I don't suppose you would see one per cent. of Smock planted. Late Crawfords have not been planted. What we want is something to fill in that gap, otherwise our season is going to move forward. Now, there is big money in late Crawfords, bigger money I believe than any other variety. There is one thing Mr. Fisher did not tell you, that is in the Queenston district which he speaks about, the Crawford is a week or ten days ahead of any other district.

A MEMBER: What about the Garfield.

MR. ONSLOW: The Garfield is something like the Crawford, an excellent quality, good shipper and desirable peach if you can get a crop.

A MEMBER: I would like to say a word about that Cowl peach. We have trees over fifteen years old and after seven years' experience, find it is a very heavy bearer, and never fails. The fruits are very large and come in ten days ahead of the St. John. We have found where you would get seventy-five cents for a basket of St. John, you would get $1.00 for a basket of Cowls. One big fault with them is they over-bear. I don't know of any peach that bears as heavily as they do.

MR. SMITH: Mr. Jones has a new orchard of Cowl bearing and it certainly is a good cropper, good quality, and it is a wonder to me why it has not been taken up before. I know we were growing it a number of years ago, but discontinued it. Mr. Palmer has recently found what a good peach it is and since then it has been produced by most of the nurserymen.

Q.—What about the Vimy and Vedette?

MR. PALMER: Are there any growers here who have seen the Vedette?

MR. ARTHUR SMITH: I have not any in bearing except the Vedette which had a few peaches on, but to my mind they will be worth planting.

MR. PALMER: The Vaughan peach was sent out under the number of 131617; it was the first one sent out and it was sent out mainly because it was hardy. There is one thing that has been mentioned here and that is the question of hardiness in peaches. In last year's survey after the freeze and also in the survey we had made this year after that freeze in the end of January, we have found big differences in varieties. Rochester stands out as one of the hardiest in bud and where Elberta will be pretty badly killed, Rochester will have more than enough buds left for a crop. The same holds true of this variety Vaughan. We were claiming only hardiness for it, but it is doing fairly well with a number of growers. I don't know if nursery stock is available or if so, how much.

MR. ONSLOW: There are some being grown. It is early and a heavy grower and much like Rochester in that it will require pretty heavy thinning one year or another.

Q.—Might I ask Mr. Fisher if he intentionally omitted to mention Admiral)ewey. We made more money out of Admiral Dewey a few years ago than ny other variety.

MR. FISHER: I didn't mention them because we don't grow them. It ıight be a good variety and it might be a money-maker, but that is the only eason I didn't include it.

MR. MARLOWE: I think Admiral Dewey is one of the best early peaches hat is grown. I have sold a great many Dewey for early Crawfords and had good many satisfied customers. They asked for early Crawfords at that time f the year, and said they were the best early Crawfords they ever used. I ot $1.00 a 6-quart basket for them, and was quite satisfied. They are a heavy earer, never miss a crop, but I would not advise any of you to plant too many f them because they come just before the Rochester.

I want to take a little exception to that Red Bird; if you ever want to enter he Kingdom of Heaven, don't plant it. I have had one tree and they have been ending us yellow papers every year. It is a beautiful peach to look at, a lovely each to catch the eye, but nobody can eat it.

Q.—Could not you sell it as California Beauty? A.—I tried it and they rought it back.

Q.—What was your experience with rot in regard to Admiral Dewey? \.—It is not as subject to rot as Triumph. You can control it by spraying or lusting; dusting particularly will hold up Admiral Dewey until it is all ready o market.

PEARS—COL. H. L. ROBERTS, Grimsby

Before I say anything about pears there was a remark made by the previous peaker that I would like to emphasize, because I don't think the average grower uite realizes the importance of it, that is the matter of our planting too much f one variety. Two of the biggest difficulties that the grower has to meet is hat of transportation and market, to have sufficient cars and facilities to move he crop. A crop that comes on all together puts a tax on the transportation ompanies that they are hardly in a position to meet. I think it is the same hing about the markets. I think the remark about spreading the crop is a hing that should be taken to heart.

Now, with regard to pears, I was just thinking while the peaches were being liscussed, what a peculiar condition we are in with regard to pears. Practically peaking we are down to two varieties, the Bartlett and Keifer; they seem to be he only varieties being planted. The Bartlett is the finest pear on the market, nd I think the season can be extended by cold storage to a limited extent. t is distinctly perishable pear; it is probably as delicious as you would find.

Now, taking them in varieties as they come through the season, I personally ave had no experience with an early pear, but one grower speaks well of the Gifford. He said it is practically the earliest quality pear which is marketed rom the district. With myself, Bartlett is the earliest pear grown followed by he Duchess and Anjou; in both cases these pears should be grown as dwarfs; would not recommend them to anyone as standard because firstly, they are lways of a small size as standard, and secondly, you lose three-quarters of your rop by having them blown off. In the dwarf, you will lose a fair proportion ut nothing like you will with a standard. There are other varieties that are dvisable, I think, to plant, although when I say advisable, I mean from the oint of policy as regards the market. The market is asking for the Bartlett ractically exclusively, it is the only pear that the average consumer seems to

know. Yet I think it is a pity to leave out many of the best varieties which we have, and under the present condition we have surrendered our winter pear market to the Western States. When we can grow dwarf pears that will compare favourably to the Western States, I don't see why we should.

The Winter Nelis is very good but it grows a very straggly tree and many years we don't get it properly finished. The Bosc is an excellent pear, but owing to the fact we have no local market for winter pears at present, we have to export them. For the last two years this variety has been doing particularly well. Then the Boussock comes in with the Bosc; it does not appear to be raised as well as some of the others, but peculiarly enough last year they were excellent and they sold very well in the Old Country market. Our Winter Nelis, which we can hardly expect to compare with the western fruit, can be replaced in our plantings with Lawrence. Lawrence has been marketed about three months before it should be. It is one that should be kept until the spring, until it is matured. It is a very attractive yellow colour and if shipped about April it is certainly an excellent pear.

One variety I have not mentioned that comes early and which I think a great deal of is the Howell. Howell is a good bearer, fairly free from spot, a large pear, uniform on the tree, very clean and a good shipper. Its quality, of course, does not come quite as high as some of the others. Louise Bonn is a good pear of excellent quality but inclined to be on the small size. The Sheldon is another one of good quality but a very light cropper.

I have one prejudice that I have always had in connection with pears, I hate the Keiffer and I won't grow it. I bought a large acreage a good many years ago which had a good many Keiffers on it, and as I was determined I was not going to grow it, I top-worked all those trees; Keiffer stock, however, when it is grafted will give you good growth for a few years but the trees finally die. Top-worked it becomes an easy prey to fire blight. I grafted a good many young trees with Howell and in every case I lost my trees.

Q.—What about the Clairgeau? A.—That is a good winter export pear, a little later than the Duchess.

Q.—Have you had any experience with the Comice? A.—I have grown it or tried to grow it. I am very doubtful whether I have got the variety true to name. If it is I don't care for it.

Q.—It is a wonderful pear in England; bringing high prices on the market. A.—Yes, but we cannot grow it here. I got some of the stock from the Old Country and if it was Comice, I don't recommend it. I took a sample over to Mr. Palmer and he will tell you whether it is Comice or not.

MR. PALMER: I think it was a good second cousin to Keiffer.

MR. PAUL FISHER: I would like to know what good varieties you are going to give us.

MR. PALMER: I would like to know myself. I am afraid that is all I can tell you now. We are working for blight resistance altogether. We have two or three seedlings that look rather promising.

Q.—Do Dwarf Anjous ever bear? A.—Yes, not like the standard trees would, but they bear quite a fair crop. Dwarf Anjous give me a very good crop, that is, for the size of the trees. They have done remarkably well on the Old Country market, taking one season with another.

A MEMBER: One variety that was not mentioned and one we have had a good deal of experience with, a good blight resister and practically as good as Keiffer, is the Lawson. We have a row of Lawson which we planted thirty-five years ago and every tree is standing there; it is an early pear and a good cropper.

MR. PALMER: There is just one thing in connection with blight. It is just a question whether we can judge blight resisters by the apparent resistance of old trees; whether young trees or some other trees would be as resistant is open to question.

A MEMBER: Are you in the habit of interplanting pears for cross-pollination?

COL. ROBERTS: Yes, but it is pure guess work, I don't know what pollinates anything else; I have not been able to find any information in regard to that.

CHERRIES—MR. GEO. A. ROBERTSON, St. Catharines

I think the earliest cherry that has been grown in this district is Governor Wood; with us it grows a little too well; but when we get a shy crop we get them large. It is a good pollinizer and a pollinizer among sweets is a good asset even if you don't get any crop. I might say that a great many of our standard varieties of sweet cherries are self-sterile, and I have arranged with a neighbour for his bees to be kept in my orchard.

After Governor Wood is the Early Richmond. We know the canning factories take them some seasons and other seasons leave them on our hands. They come in with the strawberries and apparently the fruit commission men cannot handle the strawberries and cherries all in the one week. The next good cherry that we grow is the Black Tartarian. It is absolutely necessary to have some other kind of that season for pollinizing so you have Napoleon and Yellow Spanish. I like the Napoleon myself, they are good croppers, and have brought as high as $1.10 a six-quart basket. Following is the Elkhorn, a shy bearer but of very large size, and we have got as high as $3.00 a basket for them. Following is Windsor, our best cropper, and a better grower.

Q.—Is it sterile? A.—We have never had any of them sterile, not with the bees and the Governor Wood. After all is said and done it is the maximum annual crops that count in any business. We often get a crop, being situated as we are, when the market is free from competition; that is when it pays. We grow a lot of Montmorencies, having a strain that we like very well. They grow an exceptionally fine crop and get a premium on the fruit. You can plant Morello side by side with Montmorency as the former grows so much smaller in tree.

Q.—Do you grow the Bing? A.—The Bing comes in about the same time as the Windsor. We have the Black Eagle, a canning, not a sweet cherry. It is soft in the flesh, rather small and pretty hard to get a crop. There is also the Lambert and Tennant, but I would not advise planting any of those; you will get enough variety without planting them.

Q.—What about the Pelham? A.—The Pelham has a stem from four to six inches long, fruit coal black and they come in when all the rest of them are off the market when they bring real money.

Q.—Have you had any experience with the Early Lyons? A.—I have a couple of trees, but I don't know anything about them yet. I think the Victor is going to be quite an asset. It is a big white cherry, with a red cheek, not very sweet, solid in the flesh, and I think it will be quite an acquisition to the canners. They want good size and a canning cherry should not be too sweet.

APPLES—MR. W. L. SMITH, Burlington

When Mr. Hodgetts asked me to discuss varieties of apples that we grew, I discovered we had thirty-two varieties on our farm at Burlington. The

Ontario Fruit Branch has recently issued a list of desirable varieties to plant at the present day and this list is confined to seven. To my mind the average orchard in Ontario to-day has altogether too many varieties. The Government recommendations are as follows:—

Owing to changes in market requirements and the introduction of new kinds that have attained popularity very quickly, some of our earlier standard varieties of lower quality are no longer in demand on our markets and prices offered are now generally below cost of production.

On this account, the following lists of varieties vary somewhat from those recommended fifteen to twenty years ago:

Melba—An early variety of the Duchess season, a seedling of McIntosh originated at the C.E.F., Ottawa, hardy with better flavour and keeping qualities than Duchess, good for all parts of the Province.

Fameuse—Hardy all over the Province. Two types are grown, the striped of softer texture and better quality, and the red which is much firmer and a better keeper and seller.

McIntosh—Hardy and of very fine flavour. At the present time, the most popular variety in our Canadian markets.

Delicious—Tree considered hardy in most parts of the Province. One of the newer varieties of promise which has now fruited successfully as far east as Belleville.

Greening—One of the best commercial varieties in all markets. Found hardy as far east as Belleville. Considered most promising in the southern counties.

Golden Russet—A variety recommended largely on account of its favour on the export markets. Seems to do best in the section from Newcastle to Trenton, and parts of Huron County.

Spy—Still the best winter variety for this Province and in strong demand in our Canadian markets.

The following varieties are well known and considerably planted in Ontario, but are not recommended for extensive planting without consideration of market conditions.

Astrachan—The first early red variety, good only for local markets and in limited quantities, may be soon superseded by an early McIntosh seedling from the C.E.F., Ottawa.

Duchess—Our earliest good cooking apple, but over-planted for present market requirements, and likely to be succeeded by the Melba.

Wealthy—One of the hest early dessert varieties, has been recommended as a filler on account of its early bearing and small tree. Planted in sufficient quantities to supply the markets for the present time.

Wolf River—This variety with Alexander fills a market for a large baking apple in the fall, but the demand for this type being limited, it should not be planted very extensively.

Scarlet Pippin—A high-class dessert variety, quite popular in Norfolk County, but hardy as far east as Brockville. Not sufficiently known in the markets to be recommended for other than local trade.

Jonathan—An old variety that has been extensively planted on the western coast and is in favour on most markets for its high colour and quality. A few extensive plantings are now bearing in Ontario and suggest its consideration for at least the southern counties, providing it does not show the pitting or breakdown common in the west.

King—This good apple has been condemned on its behaviour in our old farm orchards, showing weak trees and light crops. Considerable improvement in both tree and bearing habits is showing in the younger orchards and it is possible that this variety may be found profitable through the south where the tree is hardy.

Tolman—This well known variety is gaining popularity as a sweet baking apple and may be planted in limited quantities for local markets. It is not wanted for our export markets.

Wagner—A good winter variety that has been recommended as a filler on account of its early bearing and small tree. The weakness of the tree makes it suitable only for this purpose.

Baldwin—Very heavily planted in all parts of Ontario. Has not proven hardy in the eastern and northern counties and is sufficiently planted in the southern counties to supply the demand. This has been one of our standard varieties but is losing in popularity.

The first apple on the list that they recommend is the Melba. I have no Melba fruiting myself although we have some planted. I have both seen the apple fruiting and have tasted it; I would certainly recommend them from what I have observed. The apple comes in about the same season as the Duchess which it resembles very much. It has a distinct McIntosh flavour and looks like a cross between the McIntosh and the Duchess. That would be a great apple to start the season with.

The next apple on this list is the Snow or Fameuse. There are various strains; one particularly good which is known as Jones Red, which has done exceedingly well. We have not been able to get the Snow to crop as well as some of the other varieties which may be due to location.

The next on the list is the McIntosh which is so well and favorably known everywhere. Some people complain that they cannot grow McIntosh because it is so susceptible to fungus disease but that is quite easily overcome with good spraying.

Then the Greening with its quality is one of the best and a very hardy and prolific tree.

Now, they include in the list the Golden Russet. Personally, I would not plant any myself. With us they grow too green, and not a good golden russet. Probably in some districts they would grow better but with us they are not profitable.

Then the Spy, which to my idea is greatly overrated. The quality is good but it is the most difficult apple to grow, in my estimation, that we have. My brother has an orchard that is quite old and I, myself, have some trees about twenty years old. We have been able to get fairly good crops but we never yet have been able to grow a crop of Spies that we could conscientiously pack more than 50 per cent. No. 1's. I contend when you cannot grow an apple that you can pack more than 50 per cent. No. 1's, we should grow something else. With McIntosh we have been able to grow and pack as extra fancy as high as 70 per cent. and it does not take any more trouble to grow and will crop more consistently than the Spy. Therefore, I contend that the Spy, although one of our old standbys, is very much overrated.

The next is Delicious. I have quite a number of trees but none fruiting yet, that is, to any extent. I believe it is one of the coming apples. It has all the quality; the tree is very hardy, with fruit fairly uniform, that bears consistently, and the quality of the apple is No. 1.

As I said before I have thirty-two varieties, but why discuss these others? The Department gives you a list of six or seven, possibly they might include one or two others, and as these cover the whole market, why add to them?

Q.—With regard to the Golden Russet, I might say that is a good variety with the export brokers in the Old Country? A.—I understand so, but my experience with the export business has not been a financial success. If I was a young man planting an orchard I would not include Golden Russet in our district.

MR. MACOUN: I would like to say a word about the Melba, as this apple originated at the Experimental Farm at Ottawa, not exactly in commendation of it but in support of it. The most unfavourable report is that it looks so much like the Duchess it might be sold for that variety, but we employ such an expert staff of inspectors that they won't allow them to go through. We have had many reports and all are favourably impressed with it. I received a letter two or three days ago from the State of Massachusetts, from a large grower over there, and this is what he says: "I saw the Melba this last summer at Atlantic City at the meeting of the New Jersey Society—went with Prof. Finley, Blake and others, to different farms. This was August 10th and I think the Melba shown me by these men is the finest early apple of any kind that I have ever seen. In company with quite a number of other growers who are trying to keep their ear to the ground as to what the consumer wants, and to have it for him before we are deluged with shipments from distant sources, I would like to add some Melba to the plantings of new trees we have already set out." I thought that was interesting as coming from the United States.

Q.—What is the season of the Delicious; does it come after the Spy? A.—No. Delicious, if allowed to remain on the tree too long will not hold up in storage, it will go bad at the core and must be picked early after the Greenings.

Q.—Were they well coloured at that time? A.—Yes. In that connection Starking might be mentioned. It is really a red variety of Delicious. For those that are planting Delicious I think we might recommend the Starking.

Q.—What about the Golden Delicious?

MR. PALMER: We have had Golden Delicious fruiting for three years at Vineland; we find they will not hold up in storage like the ordinary variety.

A MEMBER: There are quite a lot of Kings in our section and they are doing very well.

MR. PALMER: Of course there are many varieties of apples that are desirable in addition to this list. The idea in preparing the list was to cut it down to the minimum that would cover the season.

Q.—What about the Joyce?

MR. MACOUN: The Joyce is really from the same lot of seed as the Melba; it is just a little later than the McIntosh, just before the Melba. There is one thing about the Melba, it has the longest season of any summer apple that I know, being marketed from the middle week in August to the middle of September when they were still in good condition.

Q.—What about the Lobo? A.—We have never said very much in favour of the Lobo, but other people have; in New Jersey they speak favourably of it and they think it will take the place of the Wealthy; it is a solid red apple which colours up very highly and can be sold before the McIntosh on account of its colouring so early, but we don't think the season is sufficiently different from McIntosh to make it an apple to add to the list.

Q.—Would it be advisable to plant any of Cox Orange?

COL. ROBERTS: Cox Orange Pippin is a nice looking apple, becomes almost a fall apple under our conditions. It does not have the proper Cox Orange Pippin aroma and in some seasons it grows to be all red. I think I would go a little careful on Cox Orange Pippin until there is more information about them.

A MEMBER: I think this list is a very fair one and I would not like to see any of the apples they have mentioned on that list left out, but as a Fruit Growers' Association I think we ought to recommend to the nurserymen in this province not to grow apples we don't want.

REPORT OF TARIFF COMMITTEE

MR. PAUL FISHER, Burlington

I did not realize when I was given the position as chairman of this committee some years ago how much was going to be involved. I suppose no other committee that we have in our organization has been so active in the past two years. We held something over twenty committee meetings during the year with good attendance at each. As you understand the members of our committee are nominated by each of the various local associations. Naturally we have not been able to get the members from some of the apple growing sections to attend all of these meetings as we were asking for very little change in the tariff on apples. As the tariff reads now, we have a protection of 90 cents per barrel against apples coming in from the United States. As you all realize there are few barrels brought in from the United States, nearly all boxes, and there has been a great variation in duty charged by the Customs officers at the different points. Some were charging 27 cents a box and some 30 cents and others in between. Last year the Customs Department gave a ruling that all their officers should charge 29½ cents a box. We asked in our application that this be changed to 30 cents. It would make it much easier to figure out and the change would be practically negligible as far as any difference it would make.

A year ago when the appointment of a Tariff Board was first announced we were very anxious to get an early hearing in order that we could present our case and in time that the Tariff Board would be able to give us a decision, and possibly that it might be incorporated in this year's budget. With that in view we asked for a hearing early in October, but when we got there we found that due to a technicality over which we had no control, that hearing was not legal. For some reason or other the Tariff Board was not notified in sufficient time to give the two weeks notice in the press which is required before they could have a regular hearing. However, as the representatives were there from British Columbia and elsewhere, they agreed to listen to our argument but said they would have another hearing which was duly advertised. That second hearing did not come up until December; but even then we had not given up hope of getting our case decided and getting it in this year's budget. However, as you know, the Budget has been brought down and our case has not been finished in time to be incorporated in it. Since our first hearing the Hon. Mr. Graham has been moved up the Senate and Mr. Moore has been appointed Chairman of the Board. I think I can safely say that everyone who appeared before the Board was very much impressed with the interest Mr. Moore took in our case. In the meantime we will have the advantage of the dump duty that was applied last year. This duty is nearly as important as our tariff, because we possibly suffer most from the American fruit that is sent in at very cheap prices and is

sometimes consigned when they are unable to make a F.O.B. sale. The new dumping duty offers us a greater protection against that than any kind of tariff we can get. We have tried to have this duty applied so that it will work no hardship to the consumer. It does not stay on for the whole twelve months but only for the period when we are able to supply apples in volume to the trade.

Q.—Is that the reason the Order-in-Council was announced taking the dump duty off everything but potatoes last Friday? A.—Yes. I know that it has been lifted off a good many others or will be in a few days, but whether potatoes are the only ones left I could not say. Of course, the understanding is that we will be able to put that on again next year when we have such commodities to offer to the public again. It has merely been cancelled during the period we have no commodities to offer.

Q.—Is the dump duty in addition to the tariff? A.—Yes; the dump duty says when an article is sold in any foreign country below the cost of production that the dump duty shall apply on the difference between the two prices.

With regard to the tariff, I am not going over it item by item, but I merely want to state one or two points that have been brought out, especially by the new Chairman of the Advisory Tariff Board. As you all know this Board has no power to act, it is merely there to investigate conditions and bring in recommendations to the government, and I hope that whatever recommendations the Tariff Board makes in our case will be acted upon. In conversation with the Chairman regarding our case he told us that he was going to ask us the same type of questions as he would ask any manufacturing organization asking for an increase in the tariff. He said: "When anyone comes here the first thing we ask them to prove to us is that they have enough capital invested, that they are producing their products economically, with good management and they are working economically; and secondly, they are putting up their products properly and offering them to the public in the most advantageous and beneficial method." I think you will agree that the manufacturer ought to prove those two points and if a manufacturer should, why possibly we should. We told him that we believed that under investigation he would find that we possibly are producing our fruit economically, maybe you will find we are producing it almost as economically as any other section. Of course, we were speaking of Ontario, and we believe we are producing it as economically as British Columbia, New York State or the Pacific Coast States. With regard to good packing and marketing we had to answer him that while we were not satisfied we had spent twenty years at least in trying to find some better means. We have tried co-operation and we have all lost by doing it. We have tried better grading of our produce and have always been discouraged by the returns we get back. However, the Chairman said he didn't see why it was not possible to find some better means of grading, packing and distributing our produce, and considered it equally his business to try to find a remedy. He said, "I am inclined to think if we give you what you are asking for in the way of tariff it would probably help you, but I believe greater help would be given if we could find some means whereby we could help you to do better grading, marketing and distribution of your produce." I could not help thinking that if he could give us any assistance in that line we would very exceedingly welcome it. So I say I believe your committee came away from the hearing feeling it was not as bad as we had thought at first when our requests were not included in this year's Budget.

I don't know that I need take up any more time in discussing the activities of the Tariff Committee. We employed Mr. Burrows, Secretary of the Horticultural Council, to get us a great deal of information. Our Association put up

the sum of $500 to help defray the expenses that would be necessary therewith. I might state that while he is the Secretary of the Horticultural Council and was gathering this information for the fruit and vegetable growers of the Dominion I think, the Ontario fruit growers have paid the entire expense.

REPORT OF THE HISTORICAL COMMITTEE

While the President of the Ontario Fruit Growers' Association usually touches on some of the outstanding events, climatic conditions, and growing and marketing problems of the year, in his annual address, it is, we think, the duty of the Historical Committee to also record anything of importance in case the President does not do so.

The year 1926 will long be remembered as one of the latest seasons experienced and one of the most difficult for the fruit grower to carry on his work in satisfactorily, not only in the growing and harvesting of the fruit, but in the marketing also..

The severe weather of December, 1925, did much damage to fruit buds of peaches, and in some sections of the Niagara Peninsula serious injury was caused to grapes and raspberries also. In Eastern Ontario also the raspberry canes were in many plantations badly injured.

Apple trees came through the winter well, however, in all parts of the Province where there are any commercial orchards.

There was a very backward spring in 1926, and late in June the season was still from two to three weeks later than usual. On the Niagara Peninsula the strawberry crop was not good until late in July and it was near the end of July before the raspberry season started.

There was a good cherry crop in those parts of the Province where cherries are grown commercially, but heavy rains at the time of ripening did much damage to the sweet cherries, the fruit splitting and rotting. Montmorency cherries were considerably injured also.

While the peaches were not as badly injured by the very cold weather of December, 1925, as was feared at first, the crop of late peaches was light except from about Vineland to the Niagara River.

The excessive fall rains made harvesting of grapes and plums very difficult. The orchards and vineyards were simply floating in water and this, with the late ripening of the fruit, delayed picking very much and little more than half the grapes and apples were picked by the end of October.

While the extraordinarily cool, wet and late season was very unfavorable to the tenderer fruits the apple crop was not, on the whole, seriously effected by it, though because of the very cool weather the quality was not as good as usual nor the crop as large as last year.

Notwithstanding the very unfavourable climatic conditions it is believed that the average grower did better than usual in 1926 owing to more favourable transportation facilities and better market conditions.

It is a matter of historical interest that the Provincial Governments of both Ontario and Quebec have during the past year revised their lists of recommended varieties of apples and have reduced the number very much. Both provinces are now recommending but one summer variety, the Melba, a variety which originated in the Horticultural Division, Experimental Farm, Ottawa.

Your Committee has to report that unlike 1925 when there were not less than eight deaths of prominent Ontario fruit growers recorded in the report of this Committee there are about three this year, but they are men who will be much missed.

We regret to record the passing, since we last met in annual convention, of Mr. J. Wesley Smith of Winona. The late Mr. Smith was one of the pioneers of the fruit industry of the Niagara Peninsula, and his familiar face was always to be seen in any important gathering of his brother fruit growers for many years, until declining health prevented his attendance. He was extensively engaged in the production of high-class peaches and other fruits, and also in the growth of nursery stock. The foundation of many of the best orchards in the Province were laid from stock produced by Mr. Smith. At a ripe old age he passed to the great beyond, mourned by a host of friends throughout the entire Province.

We regret also the death of Mr. W. M. Stewart of Grimsby, Phillip Wismer of Jordan, Mr. G. W. Oughtred of Clarkson, and Erland Lee of Stoney Creek, gentlemen who while not quite so well known in fruit circles were esteemed members of this Association and for the past few years were very active and prominent in their local organizations. They will be greatly missed by their more immediate associates. We extend to the families of all these gentlemen our sincere sympathy.

THE CHAIRMAN: We are always indebted to the Historical Committee for their contribution to the programme. It is sometimes difficult for them to collect the material they require, especially with regard to any prominent fruit man or members who have passed on during the year. I would like to suggest to the members of this Association in order to make the work of this Committee easier that at the time these occasions come to pass, that they would forward the information to some member of the Historical Committee. It would make their work much easier and sometimes avoid omissions which we sometimes afterwards regret.

THE CANADIAN HORTICULTURAL COUNCIL DURING 1926

E. B. LUKE, Montreal, President

Following many years of discussion and various attempts by fruit growers, vegetable growers, nurserymen, florists and other associations throughout the Dominion, to form a national body, the Canadian Horticultural Council was successfully organized at the Dominion Fruit Conference in Ottawa in May, 1922.

Many serious problems confronted those most interested in its formation, not the least of which were the basis of representation, of finance and of policy. However, with the active functioning of the Council the difficulties were gradually overcome and for sometime it has been evident to all the horticultural and allied industries in the Dominion that the organization, as originally effected, was best for all concerned.

Now, following almost five years of active service on behalf of horticulture in Canada, the Council is strongly established as a body of the utmost value and enjoys the support of every interested individual. It has commanded the respect of Dominion and Provincial Government Departments, of railways and national organizations with which it has come in contact, so that to-day the

problems of the Canadian horticultural and allied industries are sympathetically received. Previous to the formation of the Council, horticulture in Canada was considered of insufficient importance to warrant serious attention; at least, comparatively with those of other interests. A definite status has now been established for our industry and we enjoy such respect as to secure immediate attention to requests.

Probably the major objective of the Council is to bring about a closer co-operation between those engaged in the production and distribution of horticultural and allied products. The value of working towards such an objective has been realized many times during the past few years, particularly when it was essential that the industry face problems as a unit.

As an indication that the Council is truly national in scope, it may be pointed out that the chief executive officer in four years has been chosen from, respectively, Ontario, Nova Scotia, British Columbia, and Quebec.

As will be noted from the following composition of the Council it comprises representatives from every section of the industry, the growers, of course, retaining the majority representation, making it truly a growers' parliament:—

Fruit Growers.—L. E. Taylor, Kelowna, B.C.; H. L. Roberts, Grimsby, Ont.; W. J. Tawse, Macdonald College, Que.; W. W. Hubbard, Fredericton, N.B.; A. S. Banks, Waterville, N.S.; F. W. Bishop, Paradise, N.S.

Vegetable Growers.—J. T. Mutrie, Vernon, B.C.; Walter J. Cooke, Kingston, Ont.; J. H. Lavoie, Quebec, Que.; Harry Webb, Woodstock, N.B.

Nurserymen.—E. B. Luke, Montreal, Que.

Florists and Gardeners.—H. J. Moore, Islington, Ont.

Jam Manufacturers.—W. J. Brigger, Hamilton, Ont.

Cooperage Manufacturers.—W. A. Fraser, Trenton, Ont.

Canners.—W. R. Drynan, Hamilton, Ont.

Amateur Horticulturists.—J. E. Carter, Guelph, Ont.

Western Canada Fruit Jobbers.—H. C. Stockton, Calgary, Alta.

Eastern Canada Fruit Jobbers.—W. J. McCart, Toronto, Ont.

Throughout the period since organization adjustment of legislation probably constituted the big field of work, but with the majority of such problems now satisfactorily adjusted, educational propaganda will take a more important place each year. This propaganda will cover better grading, better packing, advertising and marketing.

At the annual meeting of the Council held in Ottawa on March 4th, 5th and 6th last, a full report of which was published, the following matters were dealt with and have been disposed of during the year in the manner noted:—

1. "Standardization of Grades for Crate Apples." An Order-in-Council covering this matter was recently passed.

2. "Standard Containers for Fruits." The packages as listed in this resolution were standardized under authority of Order-in-Council 1250, passed on the 26th day of August, 1926.

3. "Representation of Horticulturists on Insect and Pest Act Advisory Board." The Secretary of the Horticultural Council was appointed in an advisory capacity to the Board.

4. "Reduction of Apple Varieties offered for Sale by Nurserymen." This matter has been continuously brought to the attention of the nurserymen throughout the Dominion with the result that the list of apple varieties being offered for sale has been very materially reduced. Previous to this action by

the Council over 140 varieties of apples were offered for sale by Canadian nurserymen, whereas the present list is confined to approximately 50.

5. "Duty on Apples Entering Germany." The resolution was forwarded to the Minister of Finance, who replied that the Dominion Government did not see its way clear at the present time to make a trade agreement with Germany, as by so doing a very considerable number of products would be affected and the Canadian producers and manufacturers undoubtedly adversely. The United States receives a preference due to the fact that Germany will make an agreement with any country on the lowest terms offered by that country to any other country. The United States gives no preference and therefore was able to accept the offer of Germany.

6. "Amendments to the Root Vegetables Act." Due to the political situation obtaining during the last session of the House of Parliament legislation covering the amendments recommended was not presented to the House. It is expected, however, that this legislation will be recommended at the present session.

7. "Research Laboratory for Commercial Methods of Disposal of Fruit Surplus." This resolution was taken up with the Minister of Agriculture and received his approval, but due to the fact that no estimates were passed at the last session of the House of Commons and moneys therefore unobtainable, no action could be taken.

8. "Appointment of Advisory Board." Arrangements have been made for the formation of a Horticultural Section of the Canadian Society of Technical Agriculturists which will act in an advisory capacity on technical horticultural matters.

9. Grades for Cantaloupes." An Order-in-Council covering this matter was recently passed.

10. "Sales Tax, Canned Goods, Preserved and Dehydrated Products." No action was taken by the Government to reduce the present tax at the last session.

11. "Itinerant Merchants." As legislation covering transient traders, peddlers, etc., is provincial, the Council has closely watched the bills proposed. On several occasions objection was made to proposed legislation and beneficial amendments made. In so far as we are aware no legislation which will adversely affect the distribution of fruit and vegetables by peddlers has been passed.

12. "Reduced Minimum Weights, Express Cars." This matter was referred to Major R. L. Wheeler, who has had the matter under correspondence direct with the British Columbia shippers.

13. "Trade Agreements." This resolution was taken up with the Minister of Finance, but as the agreements had only been contracted no amendments could be secured. It is expected, however, that the trade concerned will be consulted before trade agreements are completed in future. As an indication that the Department intends to follow this policy we were advised of the proposal to negotiate an agreement with South Africa.

14. "Customs Tariff." (First)—Fruit, vegetables, nursery stock and flowers. This matter is now before the Tariff Advisory Board and it is expected will be finally dealt with by the present session of the House of Commons.

"Customs Tariff." (Second)—Duty on necessities for fruit production. As this is a matter which must come before the Tariff Advisory Board it was withheld pending the completion of previous application.

15. "Differential in Freight Rates on Crates and Boxes of Apples." After thorough investigation it was found that there was considerable difference of

opinion between the shippers and jobbers, that is the shippers did not approve of the reduction. The case is, therefore, still pending.

16. "Standard Trade Terms." No action has been taken pending the decision of this matter in the United States Courts.

18. "Consolidation of Provincial Horticultural Societies." An endeavour has been made throughout the year to encourage the formation of Provincial Horticultural Societies in those provinces where local Horticultural Societies are sufficiently numerous. Some progress has been made and it is expected that during 1927 we will have Provincial Horticultural Societies in at least two more provinces.

20. "Export of Manure." This resolution was referred to the Department of Agriculture who advised that it was not within the power of the Dominion Government to prohibit the export of manure.

21. "Blueberry Packages." The packages standardized by Order-in-Council 1250 include several suitable for blueberries.

25. "Grades for Soft Fruits." An Order-in-Council covering the grades recommended for soft fruits was recently passed so that they will be effective for the shipping season of 1927.

The matter undoubtedly of primary importance to the industries of Canada this year has been that concerning a revision of the tariff on horticultural products. For several years an agitation for a revision of the tariff, which commenced in Ontario, gradually gained weight and on numerous occasions has been the subject of discussion between the Dominion Government and representatives of the industries. On no occasion, however, has action been taken until a definite case was presented on October 12th last to the Advisory Board on Tariff and Taxation by the Council. You have noted, from the complete report of the hearing which was mailed you, that we are asking mainly for two things:—

1. That the tariff on fruits and vegetables be placed upon a seasonal basis.

2. That, in so far as possible, all tariffs be made specific rather than some ad valorem and some specific.

The present tariff and the tariff requested is as follows:—

1st.—Fruits and Vegetables.

	Recommended tariff		Present tariff
Potatoes	50c. cwt.	All year	35c. cwt
Onions	½c. lb.	All year	30%
Cabbage	1c. "	June to January	30%
Cauliflower	2c. "	May 15 to Nov. 30	30%
Celery	2c. "	June 30 to Dec. 31	30%
Asparagus	3c. "	April 15 to June 30	30%
Carrots	1c. "	June to February	30%
Beets	1c. "	June to February	30%
Peas	3c. "	May to September	30%
Beans	2c. "	June 15 to Oct. 21	30%
Lettuce	1½c. "	April to November	30%
Cucumbers	2c. "	May to November	30%
Spinach	1c. "	April to November	30%
Radish	3c. "	All year	30%
Tomatoes	2c. "	June to December	30%
Peppers	5c. "	July to November	30%
Mushrooms	10c. "	All year	30%
Parsnips	25c. cwt.	"	30%
Turnips	25c. "	"	30%
Egg Plant	2c. lb.	"	30%
Parsley	5c. "	"	30%
Water Cress	10c. "	"	30%
Witloof	10c. "	"	30%
Brussels Sprouts	5c. "	"	30%
Shalots	2c. "	"	30%

Fruits and Vegetables—Continued

	Recommended tariff		Present tariff
Rhubarb	1½c. lb.	March, April and May	30%
Other vegetables	2c. "	All year	30%
Cherries	2c. "	"	2c. lb.
Peaches	2c. "	July 20 to Oct. 31	2c. "
Pears	1c. "	July 31 to Dec. 31	½c. "
Plums and Prunes	1c. "	July 15 to Oct. 31	30c. bu.
Strawberries and Raspberries	3c. "	June and July	2 lb.c.
Apricots	1c. "	All year	½c. "
Cantaloupes and Muskmelons	3c. "	July 31 to Dec. 31	3c. each
Other Melons	3c. "	All year	3c. "
Cranberries	½c. "	"	25%
Apples	30c. box	"	90c. bbl.

2nd.—Nursery Stock and Flowers.

	Recommended tariff	Present tariff
Apple trees	7½c. each	3c. each
Pears, Plums, Cherries and Quince	9c. "	3c. "
Peach	6c. "	3c. "
Roses	10c. "	30%
Paeonies	5c. "	25%
Flowering Shrubs, except for lining out for future development	25% net min. (against any country	20%
Nursery Stock for lining out and Nursery Stock N.O.P.	25%	20%
Tariff item No. 79, viz., fruit and rose stock for building or grafting	Free	Free

A public hearing on this whole matter was held on December 16th in Ottawa, at which strong representation from the Council was made.

Co-incident with the agitation for the revision of the tariff, we have for several years been pressing for a satisfactory enforcement of the dump clause on fruits and vegetables. Early this season the Dominion Government, at the request of the Council, set the following minimum values at the point of production for fruits and vegetables:—

	Per lb. net		Per lb. net
Tomatoes	5c.	Peaches	4c.
Cucumbers	3 c.	Raspberries	17c.
Cabbage	1¼c.	Plums and Prunes	3c.
Celery	2c.	Pears, Fancy	3¼c.
Onions	1¾c.	Pears	2¾c.
Potatoes	2c.	Cantaloupes	5c.
Asparagus	10c.		
Carrots	1½c.		
Beets	2c.		
Lettuce	3c.		
Spinach	3c.		
Cauliflower	2½c.		

Apples:	Standard boxes
Extra Fancy, medium to large	$1 80
Extra Fancy, in small sizes (175 and under), and Fancy, medium to large	1 50
Fancy, in small sizes (175 and under), and C Grade, all sizes	1 25
Combination Extra Fancy and Fancy	1 55
Combination Fancy and C. Grade	1 35
Orchard Run	1 45
Unwrapped Jumble Pack	1 20
Small Fancy and C. Grade in bushel baskets or hampers	1 20
	Standard barrels
No. 1	$4 50
No. 2	3 75
Domestic	3 50
No. 3	2 75
Bushel baskets, hampers or crates	1 35

It is doubtful if anyone in attendance is familiar with the manner in which dump duties are applied and, consequently, with the tremendous advantage such application has been to you as a grower. Under these circumstances, it is permissable to explain to you the section of the Customs Act concerning dump duties. In the case of apples, you will note that the minimum value of No. 1 Grade was set at $4.50 per barrel. Where apples were imported at a lesser value than $4.50 per barrel, and many were offered this year in New York State at $2.50 per barrel, the shipments were subject to the following duty:—

Regular Duty	$0.90
Dump Duty—15 per cent. of $4.50	.67½
Total Duty	$1.57½

Thus, through the application of dump duties, many thousands of barrels, which otherwise would have been imported into Canada, were prevented from coming.

The application was probably even more stringent in regard to vegetables.

The Council now has a clear understanding with the Department of Customs that dump duties will be enforced on a basis agreed upon by the Council and which was submitted to you, together with the report of the tariff hearing above referred to.

One other matter to which the Council has devoted very considerable effort, and which is of vital importance to you, is that of National Apple Week.

While such an occasion has been observed in the United States for a number of years, it was not until 1925 that any concerted effort was made to establish in Canada this very advantageous means of advertising. At that time the Council organized the National Apple Week Campaign, which was so generally adopted and so successful as to encourage future increased efforts. This year National Apple Week was observed in every Province of the Dominion and was, for the first time, truly National in scope.

It is estimated that over $25,000 worth of free publicity was secured for the apple and every consuming centre in the Dominion is unanimous in the opinion that, as a result of the efforts made, apple sales were increased two, three and four-fold. The major effect, however, has been that apple sales on a large scale have continued, so that the crop is moving into consumption throughout the Dominion in an easier manner than it ever did previous to the inauguration of National Apple Week. Some points in the celebration are worthy of note:—

Thirty thousand four-colour apple hangers and 1,000 cotton truck banners were distributed and prominently displayed throughout the Dominion.

Over 100 service clubs co-operated by having a special apple luncheon, addressed by speakers prominent in the apple industry.

Twenty-two radio stations broadcasted an apple message which, it may be conservatively estimated, reached millions of people.

Hospitals, orphanages and public institutions of all kinds in the larger cities were supplied, gratis, with apples and the resultant publicity played a very major part in increasing demand.

The retailers in many cities eagerly co-operated by organizing and entering window dressing competitions.

The railways operating in the Dominion published special apple week menus and, together with hotels and restaurants, featured special apple dishes.

In one city alone over 100 columns of news space was devoted to stories about the apple.

All of these features and many others, including apple shows, apple stories :ad in the schools, apple stickers, etc., played a large part in making National .pple Week one of the most potent factors in increasing apple sales and so efeating the rapidly decreasing Canadian apple appetite.

Standard Score Cards

After consulting every authoritative power in the various provinces and in he United States, Prof. T. G. Bunting, Chairman of the Standard Score Card Committee, recommended the approval of score cards to be used in the judging f fruits, vegetables, flowers and gardens. The recommended score cards were rinted in booklet form and some 2,000 copies distributed. There is no doubt hat the general adoption of a uniform score card throughout the Dominion vill be to the very great advantage of exhibitors and the adoption of those ecommended as national score cards is suggested.

In view of the many successful accomplishments of the Council the support of every individual interested in any aspect of horticulture in Canada, is respectully solicited in order that the national organization may not only be enabled o continue but may expand its efforts and increase its service and usefulness along the following lines:—

By advancing all matters tending towards the improvement of the horticultural and allied industries in Canada, including production, grading, packing, transportation, storage and marketing.

By bringing about a closer co-operation between those engaged in the horticultural and allied industries in Canada and a fuller understanding of their problems.

By initiating, fostering and assisting in obtaining such legislation and regulations as will be beneficial to the horticultural and allied industries.

RECENT CHANGES IN THE FRUIT ACT

G. E. McIntosh, Ottawa, Dominion Fruit Commissioner

The Fruit Act or grading of fruit probably goes back to 1892 when apples were placed in the commodities coming under The Inspection and Sale Act. Up to that time the fruit growers realized the necessity for something being done that would put their commodity on the market in better condition. To meet that situation apples were added to the Inspection and Sale Act and I think about the same time cheese was put in the Act. Now in 1892 and up until 1901 there was not very much machinery for carrying out the provisions of that Act. In 1901 an Act embodying grades was introduced in the House by our popular and beloved friend Senator E. D. Smith and the Government then appointed a staff of inspectors to enforce those provisions. From that time until to-day there has never been an amendment introduced affecting the marketing of fruit except on the recommendation of the growers and I hope so long as it is my privilege to act as Fruit Commissioner that condition will continue.

The Act was revised at different times until 1923. In 1923 I recommended it be taken out of the Inspection and Sale Act and made an Act of itself called "The Fruit Act of 1923." Since 1923 the amendments are as follows:—

In September, 1924, by Order-in-Council provision was made that "The provisions of the Fruit Act, 1923, and regulations thereunder in respect to fruit and fruit packages or containers shall also apply to fruit and fruit packages imported for sale in Canada." We had some difficulty in enforcing the import regulations at that time, in so much as it was claimed in Court it would not apply to tomatoes. Therefore, by order-in-council that was corrected. We had cases in Court where imported tomatoes were in competition with Canadian grown tomatoes and when we endeavoured to apply the provisions of the Act the question arose as to whether a tomato was a fruit or vegetable. In order to safeguard our interest I had another order-in-council brought down at the same time which reads as follows: "Except as provided in Regulations 1 (b) all fruits known botanically as such, shall be subject to these regulations; including apples, crab apples, pears, quinces, plums, prunes, peaches, apricots, cherries, grapes, strawberries, raspberries, loganberries, black and red currants, gooseberries, tomatoes, melons, cantaloupes and cucumbers."

The original Act included grades for combination extra fancy and fancy and combination fancy and "C" grade. It was thought in 1922 that this was a necessity to meet competitive conditions on the Prairie markets, almost all the fruit came from British Columbia. After trying it out the British Columbia Fruit Growers found it was not necessary to have these combination grades, it was simply adding to the difficulty of marketing and on their recommendation in 1925 combination grades were eliminated.

At the same time a provision was made whereby "The Minister, with the approval of the Governor-in-Council, shall have power to prescribe additional grades for individual kinds of fruit; to prescribe the kinds of fruit to which grades defined under this subsection shall apply, and to make such regulations as may be necessary for making effective the provisions of this section. Grades so prescribed and regulations so established shall be in force from the date of their publication in the *Canada Gazette*." That change was made in order to more easily take care of the increased demand for grades for other fruits. It was felt that instead of having to go to Parliament to have the Act amended, this change was made so that where grades were wanted they could be established quickly by order-in-council.

Largely on the recommendation of the growers of the Niagara Peninsula the following section was also added: "Every person who, by himself or through the agency of another person, packs fruit in closed or open packages intended for sale, or who offers for sale or sells fruit, and quotes or represents such fruit to be of any grade specified in Section 3 of this Act, or regulations made thereunder, shall cause to be shown on the package or on an approved label attached thereto, the grade and other marks required under this Act." That was a provision in order to take care of a situation with which you are all very familiar. Fruit was being packed in unmarked baskets and quoted to the wholesale trade as being of No. 1 grade while of poor quality and at the same time other men were packing their fruit to a quality grade of No. 1 and so marked. Such competition was seriously affecting the grades for the better quality of fruit.

In 1926 there had been a number of applications for different kinds of packages which had not been standardized up to that time. These packages included the cantaloupe crate, the tomato lug, the bushel hamper, the half box, the six basket carrier for peaches and a few other packages. These were incorporated as standard packages in the Act in August of that year.

On the 5th day of January, 1927, complying with the recommendations made by various fruit growers organizations the grades for cantaloupes, apples

in crates, plums or fresh prunes, pears, peaches, field tomatoes, cherries and grapes were established by order-in-council.

It seems quite evident, in fact it is our experience in checking over some 75,000 inspection reports every season to learn that there is a constant growing demand for fruits and vegetables of a high standard. There is very little difficulty, apparently, in effecting sales for a quality product, and I am indeed pleased that the fruit growers are grasping this situation and particularly in the Niagara Peninsula. I doubt if there is a more difficult section in the Dominion of Canada to consolidate shipments, to handle the output of the orchard, than right in this very Province. It is difficult because of the wide area of the Province. We grow strawberries and cane berries in almost every section, while plums, sour cherries and pears are widely planted.

The consumption of fruit in Canada to-day is as great as it ever was, but the consumption of apples is nearly 50 per cent. less per capita than it was fifty years ago. The consumption of oranges and grapefruit has gone up 64 per cent. So you can see the need of advertising. I believe that the consolidation of effort should be along that line. Make your product known to the public and be prepared to give it to the public in the way in which he wants it. You must consider that fellow the consumer because he is to-day footing the bill to the extent of $15,000,000 annually for the apple crop. I cannot recommend anything more strongly to you gentlemen, if you have three or four growers in a district, or twenty-five growers, belonging to an Association or an individual grower with sufficient produce, establish a brand and let your product go on the market under that brand. Now, the Fruit Act only established the minimum at which the fruit can be put on the market but there is nothing to prevent you building up a higher standard. You know that the organizations in the Okanagan Valley have their own standard which is higher than the minimum of the Fruit Act, and we authorize our inspectors to co-operate with them in building up that standard and inspect on the basis on which they sell. That is one of the reasons why you will find British Columbia apples selling in the Eastern Provinces in large volume.

GRAPE VARIETIES

F. E. GLADWIN, Fredonia, N.Y.

Within very recent years the grape growers of the States have become interested in new grape varieties. I well remember not over eighteen or twenty years ago that it would have been folly to have talked anything other than Concord, Niagara and Catawba to the grape growers of New York. However, within recent years there has been a marked change of attitude on the part of New York growers—on the part of eastern growers, I might say, because grape growing has now extended into the east as never before and even into the south. There are several reasons for this change of attitude on the part of grape growers and chiefest among which is the fact of the improved highways, whereby the town and city person or family can get into the country where produce is grown and buy it directly and carry it home. So, then, at the present time there is a very great desire on the part of eastern grape growers to learn all the qualities of new varieties that are offered from time to time.

I will speak first of those varieties with which we have come in contact that have been originated from other sources than from the experiment station at Geneva with which I am connected. Within recent years you have perhaps seen advertised in the agricultural press of Canada the Caco grape put out by J. T. Lovett, of Little Silver, New Jersey. This grape has been advertised very extensively, thousands of dollars have probably been spent in bringing to the grape grower the qualities of this variety. Later other nurserymen have taken up the variety and have advertised it as perhaps they have no other grape variety in other years. The Caco grape, as its name indicates, is a cross between the Concord and Catawba. In our experiments we have found that neither of these parents gave anything very desirable to their progeny, and when Caco has been tried under commercial conditions it does not measure up to the advertising. Caco is a sickish sweet grape which ripens its fruit very unevenly. In many years the fruit which should be light red does not attain full colour. The worst fault of this variety is that it loses its leaves long before the fruit is anywhere near mature. The foliage withers and drops badly. Of course, the variety might be in the garden for home use. It is too sweet for my taste and there does not seem to be the sugar acid ratio that should exist in a palatable variety.

Another variety that has come into the press in recent years is known as the Adams. This also is supposed to have originated from New Jersey. The Adams grape is also put out under the name Champagne. I cannot imagine a poorer grape for champagne making than this Adams or so-called Champagne. It is foxiness personified; it is so foxy that it smells in the vineyard. There are a few individuals who do like that strong foxiness in grape varieties, but I think the rank and file do not require foxiness to the extent that exists in this Adams or so-called Champagne variety. The variety as far as cluster and size of berry is concerned is a very showy one. The clusters are large and the berries are very large. The colour is not the best; it is a very sickly or pale red, inclined to a bronze. I cannot see any place in commercial vineyarding for the Champagne or Adams.

Now, aside from those two varieties there has been nothing that has been pushed so much in grape varieties that I am aware of. From time to time we have sent to us cuttings or roots of some of the new varieties, so-called, which may be an old variety masquerading under a new name and which, if it is not of that type, has no special merit. We have tested out several new varieties. As yet we have found nothing that will rank in favour with the Concord, the Niagara or the Catawba or the Delaware. But I do not believe the grape growers should be satisfied with Concord, Niagara or Catawba. I think there are better things in store for vineyarding than those varieties. This matter of variety is becoming to be more and more recognized. The consumer is becoming more critical.

I want now to refer to a few seedlings that have been originated and named by the New York Experiment Station at Geneva, New York. Starting with the Fredonia, which was named within the past season, we have an early black variety which offers considerable promise for the roadside market. Fredonia comes from rather humble parents and parents which one would not think would add much: Champion being the female parent and Lucile the male. Neither one is considered as being especially desirable. Most of you men who are growing grapes probably know the Champion and Lucile, but it seems to be the case with grape varieties, with some of those sorts that have characteristics that are repellant or undesirable, do have in them possibilities that are handed down

to the progeny which are really worth while, and so with the black early grape Fredonia we have a better grape by far than either parent. Fredonia is an early grape that ripens a week earlier than Moore's Early. It is much more attractive both in size of cluster and in size of berry. It is more attractive by a much heavier blue bloom and it is also a very vigorous grower, which, of course, Moore is lacking in. All in all Fredonia is a good grower, much superior to Moore in those respects as well as in quality. Now, I do not want to infer that Fredonia is a high quality variety; I will say that it ranks but a little below Worden in that respect. Fredonia is higher in sugar but it is also higher in acid and Worden is naturally low in sugar and low in acid so that Worden appears tastier than it really is. Fredonia is a little lower in quality so far as taste judges it than Worden, but it has this advantage, in that the skin is very tough and promises to ship well. The variety also keeps well after ripening. As I have said it ripens a week ahead of Moore, ripens with Champion and Daisy; yet it will hang on the vine in excellent condition until Concord is fit to be picked. We believe Fredonia will displace such varieties as Champion, Daisy and Moore and it will probably give Worden a run.

Now, passing on to another early sort, Ontario, we have a white grape of excellent quality. Ontario is a cross between Diamond and Winchell. Diamond is a variety rather high in acid; Winchell a variety rather low in acid, but in the progeny, Ontario, we find a happy blend of the acid and sugar, so that Ontario is a very desirable grape for dessert purposes. We also find Ontario is a very desirable variety for jelly purposes. It makes one of the finest light coloured grape jellies with which we have had any experience. The variety is a golden yellow, like Niagara when fully ripe. The cluster is fully as large but not so compact, while the berries are as large as Niagara. It is very fruitful, ripens fully two weeks earlier than Niagara and one sample invites more. In our work at the vineyard station we try these new seedlings on the travelling public and cultivate their opinions, their likes and dislikes, for we believe that we are getting close to what the public actually wants when we can hear them discourse or talk about the merits or demerits of the variety. We find that Ontario invariably meets the taste of a majority of the people who are travelling our highways and who are eating grapes. Ontario is probably not so hardy in bud and wood as Concord. I think it is just as hardy as Niagara, but coming two weeks before the Niagara it fills in a gap for white varieties. Ontario should certainly displace Green Mountain or Winchell, which has been the leading early white sort, and the nurserymen in the States are gradually discarding Winchell in favour of Ontario.

Another variety of which I want to speak is also an origination of the experiment station and has been named Sheridan. Sheridan is probably the highest quality grape of the American type, of the new world type, that the station has originated. It is a black sort and comes as a result of a hand pollination of Herbert by Worden. Herbert is one of the Rogers Hybrids, a black grape, fairly early in season but one inclined to scant productiveness with straggly clusters. In Sheridan we have a combination of characters that seems at the present time hard to beat. We have the size and compactness of Worden in this grape, we have the size of berry—I might say a larger berry in Sheridan than in Worden or in Herbert—and we have a berry with a very tough skin, again an improvement over Worden. Sheridan is very productive, one of its chief faults being that it is inclined to over-production, and requires very close pruning in order that it may not wear itself out in the production of fruit. The [illegible] covered with a very heavy blue bloom which makes the fruit very

attractive. Sheridan probably is about the equal of Concord in vigour but it ripens its fruit probably a few days later than Concord, although it is hard to judge at the present time because we are comparing young plants of Sheridan with old plants of Concord. The gap between the ripening of Sheridan and Concord has gradually narrowed down within the last few years and it may be, after Sheridan becomes sufficiently stabilized and settled down, that we have a grape practically in season with Concord. I hope so, at least. The great value of Sheridan aside from its high quality and attractiveness lies in the fact that it is a good keeper. We have at the present time several crates of Sheridan in a common storage cellar underneath our packing house that are apparently in as good eating condition as they were the day they were picked. In 1924, we held the variety Sheridan in this same storage in good eating condition until May 15th. Of course, those are extremes but they are an indication that the variety has not got to be rushed off to market just as soon as it comes from the vine but that it can be put aside in a cool room with fairly good ventilation and keep for a reasonable time in good condition. If one were to expose Sheridan and Concord side by side to the consuming public there would be no question as to which the purchaser would take, because due to the size of the cluster, the compactness, the size of the berry and general finish or bloom of the Sheridan, one would be inclined right away to buy that variety on looks alone and he would not be deceived thereby because the variety is of excellent quality.

There are other seedlings and there are other varieties growing in different climates that have some merit but all in all I think I have covered pretty well the newer sorts of grapes. I have not touched much on some of the older cultivated varieties but I want to say in closing that the grape growers in western New York realize that they must have a grape of higher quality than the Concord. They realize that very fully, perhaps, since the season of 1926 closed. It has been a matter of common talk amongst them that they must have a variety better than the Concord. Now, we think we have it in Sheridan, but of course we will not stop there. Sheridan may be only the fore-runner of something more desirable still. But at the present time the worthwhile varieties with which we have come in contact in the past eighteen or twenty years are, of course, the ones you are familiar with and some of these newer ones that I have mentioned. I do not want to infer for a moment that the New York Station has the entire call on the production of all good varieties but we were fortunate, perhaps, in having succeeded in bringing out several within the last few years that really have good promise.

SOME EFFECTS OF SPRAYING MATERIALS ON FRUIT AND FRUIT TREES

W. C. DUTTON, East Lansing, Michigan

The old idea of a good spraying material was that it should satisfactorily control the disease or insect for which it was used without causing too much injury to the tree and fruit. During the last few years our ideas of materials have changed considerably. We still insist that they shall be effective in pest control, for that is the reason for spraying, but now we pay more attention to

foliage injury, probably because the value of the leaves to a tree is better understood. A leaf is not on the tree simply for looks but plays an important role in the performance of the tree. We are also coming to give greater consideration to the effect of fungicides and insecticides on what we may term the "finish" of the fruit, whether it is russeted, dull in colour and unattractive or whether the surface of the fruit is blotched and spotted with spray residues. The question of "finish" is important because of the greater appeal of bright, clear fruit to the purchaser and also because of the spray residue problem which confronts us at the present time.

Another angle of spraying investigation which has received relatively little consideration is that of the effects of the materials upon the plant itself. These have sometimes been called "physiological effects of spraying materials." The term "physiological" is used because physiology deals with the functions of the plant, and by plant functions we mean the processes which take place in the leaves, fruit, bark and roots. Examples of plant functions are: the taking in of water through the roots and giving it off through the leaves, the manufacture of starch and sugar in the leaves, the absorption of nitrogen and other mineral elements from the soil and the combining of them with the materials manufactured in the leaves. Other processes might be mentioned but these are enough to show what I mean.

I do not want to give the impression that spraying materials have been found to affect all these particular functions and I am not sure that all the things which have been observed along this line are, in the strictest sense, real physiological effects but that is a rather convenient term which can be used until a better and more accurate one is found. It will be well, at this point, to state that I shall not attempt to explain how all the things I will discuss are really brought about or what the influence of some of these so-called "physiological effects" may have on the behaviour of the tree. In other words, we know that certain things may happen but cannot explain just how the spraying material affects the plant in order to produce the observed effects.

Since oil sprays are very much talked about now it may be well to discuss some of the things that are known to have happened in various parts of the country where oil sprays have been used. Three or four years ago one of the trade papers published the statement that peach trees in Southern United States had suffered considerable winter injury where fall applications of oil sprays had been made. The idea came to one of the members of our Horticultural Department that this injury might, in some way, have been connected with the premature breaking of the rest period of the trees so that they became active sooner than normal and were more tender to low temperatures that followed. Whether that really happened or not in those Georgia peach orchards will never be known but working on that idea we made some studies to determine what effect oils and other sprays might have on the behaviour of peach and pear trees in Michigan. I think most of you know what is meant by the term "rest period," but in order that this point may be clear in your minds I will discuss it briefly and point out the difference between the rest period and another condition with which it might easily be confused. I refer to "dormancy" or the dormant period of a plant. By dormancy is meant the period when a peach or an apple tree is inactive, which in general starts when the leaves drop in the fall and ends at some indefinite time in the spring when growth starts in a visible or perhaps an invisible way.

The rest period probably begins at the same time as the dormant period [illegible] termination takes place at a much earlier date. This period of rest

must be broken before growth can start. The length of time it endures and the ease with which it is broken vary much with different kinds of plants, with different varieties of the same species, as with the peach for example. In some plants there is no rest period and growth can start again whenever conditions are favourable. The rest period may be broken in several ways. Properly applied heat will do it. Low temperatures will also bring it about and time is sometimes a factor when it is not broken by some other method. Treatment with certain chemicals will also terminate the rest period and this brings us back to our spraying experiments.

A fall application of several materials were made in early November. Among these were two well-known brands of miscible oils, lime-sulphur and soluble sulphur which is a sodium-sulphur compound. The usual precautions in connection with fall applications of oil were observed so as to avoid trouble in that way. Shoots or branches from trees under each treatment and from unsprayed trees were cut at intervals and placed in water in a greenhouse where the temperature was such that growth would begin if the rest period had been broken. The observations concerning the effect of the spraying materials may be stated in a general way as follows:

These shoots were cut twelve days after spraying and in three weeks after cutting the shoots from unsprayed and from lime-sulphur sprayed trees were still inactive. With the soluble sulphur treatment there was rapid development of fruit buds on the peach and of leaf buds on the pear (there were no fruit buds on the pear wood). The oil had in some way affected the shoots so that growth on the peach was active while with the pear there was little indication of growth, but we found that most of the buds had been killed. No growth developed at any time on these shoots in the greenhouse but the injury developed much more there than on shoots left on the tree. At thirty days many blossoms were open on the soluble sulphur-sprayed shoots but with the oil treatment so much injury had developed that growth stopped. The unsprayed and lime-sulphur sprayed shoots were still inactive at that time. These statements of results were for the Kalamazoo peach and Clapp Favourite pear. Another variety of peach, Fitzgerald, showed quite active growth regardless of treatment, indicating that the rest period had been very short or had been broken by natural agencies before the shoots were collected.

The question may naturally be asked as to what use we can make of this information or how it can be applied to help us in any way. I will be entirely honest and say that in so far as the effect on rest period is concerned I don't know now how it can be applied in a practical way but there is another angle to this mark which does have a direct application. Before the work had advanced very far it became evident that some of the materials were causing considerable injury so that phase of the work was checked carefully with results which may be stated very briefly as follows:

Treatment	Percentage of fruit buds dead		
	Elberta	Fitzgerald	Kalamazoo
Unsprayed	1%	5%	3%
Sunoco	84"	83"	....
Scalecide	55"	....	57%
Soluble sulphur	....	1	4
Lime-sulphur	....	....	0

Scalecide also killed many leaf buds on the peach and pear and caused considerable wood and bark injury on both. Low temperatures in January resulted in such a heavy kill of buds that the counts were discontinued but in another orchard where the buds had not been so badly hurt by low temperature the experiment was continued. Applications were made at two periods, the first in early spring and the second in late spring. The results from the early spring applications were much the same as from the fall treatment but the late spring caused comparatively little trouble.

The only conclusion that can be drawn from this work is that fall and early spring applications of at least some of the miscible oils are unsafe on peaches but that little injury may be expected from them as a result of late spring applications. This work has shown fall applications of lime-sulphur to be very harmless but I am not so sure that it may not be responsible for trouble in some places or under some poorly understood conditions. This statement is based on observations made by your Mr. Ross here in Ontario and on reports that have come from the southern peach districts of the United States. Before passing on there is one point which should be mentioned and that is, that none of the so-called lubricating or red engine oil emulsions were used in this work, but it is known that they are used regularly with satisfactory results in the more southern districts any time after the leaves go off in the fall.

Another very interesting aspect of oil sprays has to do with the advancing or retarding of the blooming period of certain fruits in California. It is my understanding that certain types of oils are used there for this purpose but that conditions have to be quite well understood in order to get the desired results. If the oil is applied too early, there will be no effect; if put on at a certain later period the bloom in the spring will be advanced and leaf growth stimulated, but if the application is delayed still further, past a certain period, the bloom will be retarded. The effect of the spray is quite closely connected with the moisture supply in the soil so it can be readily seen that the whole procedure is rather complicated. The advance or delay in the blooming period seems to be followed there by a corresponding change in the ripening date. This might be a very convenient way to delay blooming to avoid frost injury, or on the other hand if frost were not a factor the advance in the blooming period and the corresponding advance in harvest might work to advantage in that it would allow the grower to get better prices early in the season. I want to point out, however, that what I have just been talking about was done in California where conditions are very different from those in Ontario or Michigan and I can offer no assurance that, even if we wanted to, we could produce the same effects under our conditions.

Effects of this kind are not entirely new for there are records of such observations in the past. A number of years ago, workers in South Africa reported in a general way that oil sprays would advance bloom and that those containing lime would retard it. A long time ago, in 1787 to be exact, a German writer wrote about spraying in this interesting fashion: "Petroleum and other oils are also recommended, but care must be taken in their use since they act upon plants, making them sick and even killing them." A few decades later, in 1822, oil was recommended in England for the control of scale insects and plant lice but it is written that "it is very efficient against plant lice but its use is discouraged on account of it being harmful to trees." Again in England, in 1845, we find that train oil mixed with hog's lard was recommended, the lard being used to prevent penetration of the oils into the bark, but the writer adds that "train oil, even when mixed with lard, prevents trees from breaking kindly in the

spring," meaning, I presume, that they did not bloom in the normal way. These statements should probably be considered only as of historical interest and may not apply under our conditions or with the materials we use now.

Apples, as far as I know, have been influenced less by oil sprays than some of the other fruits, but a few instances have been reported. One was the case of a Jonathan orchard which received a late dormant application of a well-known miscible oil and with the result that the opening of the blossoms was advanced several days.

There is one other angle of this oil spray problem which I think will bear a little discussion at this time, especially since the use of oils of certain types is being advocated in some quarters for summer applications on apples and other fruits. The emulsions that are being recommended for such use are very highly refined and can probably be used safely in so far as direct and immediate injury is concerned and it is probable that one application to the foliage of an apple tree would cause no trouble, but it is easily conceivable that, for some uses, several applications might be necessary and under such conditions it does not seem improbable that indirect injury might follow. Some recent work in Michigan has shown that applications of oil to foliage will reduce transpiration, which means that the amount of water given off through the leaves is reduced; and further, the more oil applied the greater the reduction in the amount of water given off. Water is given off from leaves in gaseous or vapour form, and through the same stomata or breathing pores, another gas, carbon dioxide, is taken in from the air and utilized by the plant to build up sugars and other compounds that are absolutely essential if the tree is to be nourished properly. It does not seem beyond reason, then, to suspect that a heavy coating of oil on an apple leaf might so retard the gaseous exchange between the air and the leaf that food manufacture would be seriously hindered. In fact this supposition is well founded. Tests made a few years ago by one of our experiment stations showed that many of the leaves on apple trees heavily sprayed with oils had very little or no starch in them.

Still more recent reports indicate that the orange growers in California who have been substituting oils for cyanide gas for scale control have been having difficulties. One investigator has found that on these oil-sprayed trees the fruit does not colour properly and does not develop the normal flavour, and that there may be severe dropping of both mature and immature fruit.

I do not want to seem to be an alarmist or a pessimist concerning the use of oil sprays for I am confident that they are here to stay and that they will fill an important place in the operations of the fruit grower, but it does seem to me that growers should be careful about the indiscriminate use of oil sprays and fit them into their schedule only after their value has been determined by local spraying specialists.

Many other interesting things might be said about oil sprays but it may be well now to consider some other angles of the general problem of the effects of spraying materials on fruits and trees. One of the most interesting things that has come to our attention has to do with the effect of spraying materials on the size of sour cherries. The manner in which we learned that there were such differences, illustrates only too well the fact that we may be looking for one thing and see it, but pass up unnoticed much more important results. In 1921, we were conducting spraying and dusting experiments in the Grand Traverse district for the control of leaf spot or shot-hole. We were paying no attention to the fruit as leaf-spot is primarily a leaf disease, and would probably never have noticed any difference in the fruit had not the pickers, who were paid by

the pound, objected very strenuously to working on rows that had been sprayed with one of the materials. We began in 1922 to study the effects of spraying and dusting materials on the size of sour cherries. These studies have been continued for several years and I shall give you enough of the results to show what may be expected. In 1922, we used lime-sulphur, Bordeaux, sulphur dust and copper-lime dust. The comparative size of the cherries at harvest is shown in the following tabulation:

COMPARATIVE SIZE OF CHERRIES, 1922

Material	Montmorency	English Morello
Dust	100	100
Lime-sulphur	90	83
Bordeaux	87	65

The results with both dusts were practically the same, so they are not listed separately, and the fruit from the dust plot is used as the standard for comparison as 1922 was a bad leaf-spot year and the unsprayed trees were so badly defoliated long before harvest that they could not be used. In 1923, the work was continued but with Montmorency only, and as there was very little rainfall there was practically no leaf-spot and we were able to get fruit records from unsprayed trees and thus determine whether the dusts had any effect on the fruit. The results are shown in the following tabulation:

COMPARATIVE SIZE OF CHERRIES, 1923

Treatment	Montmorency
Check	100
Dust	95
Lime-sulphur	85
Bordeaux	63

A comparison of the results for the two years shows that the order of the materials was the same for both but that the dwarfing effect was greater in 1923. "Why was this effect more pronounced in 1923 than in 1922 and how was the effect brought about by the spraying materials?" are questions that may naturally be asked. These studies have been continued since 1923 and the results have been very similar to those given here. The relative effect of the materials has been the same but the dwarfing was greater in some years than others. I cannot tell you just how the whole thing comes about but we do have some very interesting data that indicate what is happening. First, the greatest dwarfing of the fruit always occurs in dry seasons and you can see the relation of this when I state the second condition which is that leaves sprayed with Bordeaux always give off water more rapidly than those sprayed with lime-sulphur and the differences in water loss for the different treatments is in about the same proportions as the effect on the size of the fruit. What probably happens is that in dry seasons there is some shortage of water and the Bordeaux-sprayed leaves seem to be able to pull it away from the fruit with the result that the cherries do not get their share. It has been proven that these leaves

can actually pull the sap right out of the cherries. This was demonstrated by injecting a red material into the cherry fruit and then making tests for it in the wood and leaves above it, and the injected material was found there in a remarkably short time.

A general comparison of the materials shows that dusts cause only a very slight dwarfing effect, that Bordeaux produces very marked results and that the effect of lime-sulphur is about intermediate. We are recommending generally that growers should use lime-sulphur and you may wonder why we don't recommend dust when it causes even less dwarfing than lime-sulphur. The answer to that is that we have not been convinced that dusting, as ordinarily done, can be counted on to give satisfactory control of leaf-spot when the season is really favourable for its development.

To give you an idea of what this dwarfing of the fruit may really amount to under some conditions, I will tell of some observations. In our experimental plots in 1923 a few cherries were missed by the pickers in many trees. Six or seven weeks after harvest this fruit was still hanging on. In the dusted and lime-sulphur sprayed trees the fruit was plump, bright and quite normal in appearance but on the Bordeaux-sprayed trees the fruit was all shrivelled and dwarfed and looked very much like dried cherries.

The other incident mentioned occurred in the orchard of a careful grower, who was also a thorough believer in the virtue of Bordeaux for spraying sour cherries but had decided to try the dusting method. He started in with dust but became panicky because he thought he was going to lose the foliage from leaf-spot injury so began a thorough campaign with Bordeaux. He put on several heavy applications in rapid succession so that the trees were literally plastered. The trees were carrying one of the heaviest sets of fruit I ever saw but there was plenty of rain so there should have been no trouble with size on account of dry weather. Nevertheless, he never picked the cherries because they never developed to a marketable size. It is needless to say that he did not spray with Bordeaux after that.

Lime-Sulphur and Fruit Production in Apples

We have heard quite a lot in Michigan, and I presume you have here, about "spraying the apples off the trees with lime-sulphur." I don't know what your observations have been regarding this trouble but you may be interested in some of our work along this line in Michigan. We have been studying this problem since 1923 and have obtained much interesting information, but I do not feel that we have any more than started, so far as really understanding it is concerned. We have obtained fruit set records and production records with several varieties under treatment with different materials and with different methods of application.

The first instance I will cite was in an orchard of mature Baldwin trees. In 1923, one block was sprayed with lime-sulphur and another with Bordeaux. Very heavy applications of both materials were made and the trees were sprayed from the outside and then from the inside. The June drop was unusually heavy on the lime-sulphur sprayed trees but only normal on the Bordeaux trees. Counts were made to determine the relative amounts of fruit that remained on the trees. These counts were made only on spurs that had blossomed that spring so that no barren spurs were included to affect the results. At the same time counts were made on other spurs on the same trees to determine how much foliage had been lost under the two spray treatments. These counts were

made on two classes of spurs; first, those around the outside of the tree, and second, those on the inside of the tree where they were considerably shaded and had also gotten full benefit of the inside spraying. The counts follow:

Fruit	Lime-sulphur		Bordeaux	
	Inside	Outside	Inside	Outside
Spurs that held part of fruit	18%	56%	57%	74%
Average number apples per spur	1.06	1.11	1.16	1.22
Number apples matured on any 100 spurs that bore blossoms	19	62	66	90
Leaves				
Average number leaves on each spur	3.6	4.2	4.7	5.1

These figures show definitely that this heavy spraying with lime-sulphur caused an excessive drop of fruit and that the drop was much heavier on the inner part of the tree, also, the total number of fruits was much smaller with lime-sulphur. The leaf counts show the greatest leaf fall with the lime-sulphur but whether leaf fall and fruit-drop go together or one causes the other, I am not prepared to answer. Another interesting observation was that the fruit on the lime-sulphur sprayed trees was much larger than with Bordeaux, in fact, the result obtained was just about like a good thinning, so it may be argued that this injury by lime-sulphur was a good thing. So far, so good, but let us see what happened during the next two seasons. I was not able to follow up the work in that orchard but the owner reported that in 1924, which would normally have been an off year, the lime-sulphur trees bore no crop but that there was a light crop on the Bordeaux trees. In 1925, the lime-sulphur trees had a light crop but the Bordeaux came through as expected with a normal crop.

In another orchard in 1924, we were working with twelve-year old Jonathan and Hubbardston. Comparisons were made of lime-sulphur and Bordeaux. Light and heavy applications of both were made on both varieties. With Hubbardston there were no significant differences between light and heavy applications of either material or between lime-sulphur and Bordeaux. With Jonathan the results were somewhat irregular but in general there was a distinctly heavier set of fruit with Bordeaux than with lime-sulphur. When light and heavy applications of lime-sulphur were compared, the general average showed a heavier set with the lighter applications.

An interesting observation along this line was made during the past season in another orchard where we have an experimental block. The trees in this orchard are Baldwin and McIntosh, twenty-four and twenty-five years old and in good vigour. For several years the owner of this orchard used a method of treatment for scab control which did not give satisfactory results, so in 1924 he resumed the use of lime-sulphur and lead arsenate spray and worked on the idea that if a little of something is good a whole lot would be better. By this, I mean that he oversprayed and the overspraying was accomplished in several ways. Extra applications were made, materials were used a little stronger than necessary and they were applied to the trees more heavily than was necessary. Although we had been working in one part of this orchard for several years, I had never known just how they were proceeding until June of last summer when I noticed that there was something wrong with many of the trees they

had sprayed as I have described. Fortunately we had a block of trees there which had received the normal treatment with the same materials for several years so comparisons were made between the two methods. This comparison was essentially between good thorough spraying on one hand and excessive spraying on the other. The first noticed result of this overspraying was on the foliage. It was small, ragged, sparse and of poor colour, while on the normally sprayed trees the leaves were large, well formed and of good colour. Counts and measurements were made at that time to determine the number of leaves per spur, the average size of the leaves, and the total leaf area per spur. This information is given in the following tabulation.

EFFECTS ON McINTOSH FOLIAGE OF EXCESSIVE SPRAYING WITH LIME-SULPHUR

Treatment	Number leaves per spur	Average size leaves	Leaf area per spur
Normal..........	8.3	12.8 sq. cm.	106.2 sq. cm.
Excessive.........	6.8	7.3 "	50.4 "

These figures show that the number of leaves per spur was not greatly reduced at that time but that the average size of each leaf and the total area per spur were greatly reduced. The next question is, "What effect did this treatment have on the fruit?" When the time for the June drop came it was noticed that the heavily sprayed trees were showing a heavy drop. Counts were made to determine the extent of this, and it was found that the June drop was much more severe where the trees had been oversprayed. It is known in this connection that we may expect a smaller percentage of the fruit to set where the bloom is heavy. We were quite sure that such a condition was not responsible for the heavier drop here, but made some counts to determine the true condition. The results follow:

EXCESSIVE SPRAYING AND FRUIT SET ON McINTOSH

	Normal	Excessive
Apples per 100 spurs that bore blossoms in 1926.................	74	44
Percentage of spurs that bore blossoms in 1926..................	64%	32%

These counts show definitely what has been happening as a result of continued heavy spraying. First, the set of fruit was much lighter; second, this light set was not due to heavy bloom in the spring; and, third, the formation of blossom buds had been affected in an unfavourable way. That is not all the story either. There was a remarkable difference in the "finish" of the fruit between the two treatments. Where the spraying was normal there was comparatively little russeting or blemishing of the apples and they were bright in colour—the finish was as good as could be expected where lime-sulphur had been used. On the heavily sprayed trees part of the fruit was in fairly good condition, for the trees had not been uniformly sprayed and some portions had not been treated so generously, but wherever there was a heavy crop or on the side of the tree towards the sprayer the condition was very different. The fruit was badly russeted and in many instances the injury was so bad that the fruit

had cracked. We shall be very much interested to follow up this work and see what happens next year.

I have been telling you what a severe drop of fruit lime-sulphur is likely to cause with some varieties of apples and with certain methods of application and if I should drop the subject at this point you would probably get a very wrong idea of my opinion in the matter. The results just mentioned all had to do with heavy if not excessive spraying, and now I want to mention very briefly what results we have gotten where the spraying has been done thoroughly but not excessively. We have obtained detailed and careful records over three seasons with several varieties and there is no evidence that normal, thorough spraying with lime-sulphur has had any effect on fruit set.

There is, however, another general effect which seems to prevail in some of the work. This might be called the "cumulative effect" of lime-sulphur on fruit production, which is different from the condition discussed in the statements just made about fruit set. This might be called "immediate effect," or the relation of lime-sulphur to the crop within any one year. The immediate effect has to do with behaviour of fruit buds after they have been formed and developed through the blossom stage to young fruits. The cumulative effect has to do with the formation of these fruit buds and therefore bears an immediate relation to production, because trees cannot bear apples in any given year if no fruit buds have been laid down during the previous summer. I do not care to make a definite and conclusive statement at this time as the evidence at hand does not justify that, but I do feel safe in saying that there is good reason to believe that, under some conditions and with some varieties, lime-sulphur may affect fruit bud formation and consequently production. In one of our experimental blocks certain rows have been sprayed with Bordeaux every year since 1923. Other rows have been sprayed with lime-sulphur during the same period. This treatment was not begun with the idea of studying production so production records were not taken for the first two years. The principal variety is Baldwin and we expected a good crop only every other year; 1924 was an off year and very little fruit was borne in either plot and it was expected that the trees would come through with a good crop in 1925. The Bordeaux trees acted in a normal way and produced the expected heavy crop, but the lime-sulphur sprayed trees had only a very light crop but we felt sure that they would come through in 1926 after two off years. Harvest records in 1926 show that on the average the lime-sulphur trees again produced a very light crop. These results are very interesting but must be taken only as indicative and not conclusive evidence. McIntosh trees in the same block behaved in somewhat the same manner but in a much less marked way.

This talk has been very rambling and I presume rather hard to follow, so a few summarizing statements may help to bring out the ideas that I have been trying to convey to you. First, certain spraying materials have been observed to break the rest period of peach and pear trees, also fall applications of some well-known oil sprays have caused marked injury to peach and pears. Early spring applications caused similar results with peach while late spring applications were relatively harmless. Second, oil sprays have sometimes caused the blooming period to be advanced or retarded, depending on the time of application and conditions prevailing at that time. Another possible effect of oils has to do with the effect of summer applications on the performance of the leaf, and there is evidence that heavy applications may affect the amount of water given off and the formation of sugars and similar materials in the leaf. The fruit may also be affected directly or indirectly by such applications. Third,

Bordeaux has caused very serious dwarfing of the fruit of the sour cherry and this influence is most severe in dry seasons. The trouble is probably associated with excessive loss of water from the leaves of Bordeaux sprayed trees.

Fourth, heavy applications of lime-sulphur have in some instances caused a severe drop of fruit, but normal applications have had no apparent immediate effect on fruit set. However, there is evidence that lime-sulphur may have a cumulative effect on the formation of fruit-buds and consequently lower production.

In closing, I want to repeat that many of the things I have been discussing are not fully understood and that we may not know how to apply the information we have, but it is a start towards a better understanding of the use of spraying materials. The whole question of spraying materials, it seems, is in a state of upheaval at the present time and the grower often is in a quandary to know what to do or what to use. However, I am of the opinion that the safest course for you growers to follow is to give your best support and co-operation to your experiment station workers so that they can solve some of the seemingly hopeless problems.

MR. PALMER: I would like to go back to the effect of the spraying on peaches. We have some results at Vineland which might be of interest to all peach growers. We have been suspicious for two or three years back that fall spraying with lime-sulphur had an effect on the hardiness of peach buds. Last fall we sprayed normal healthy Elberta trees with lime-sulphur and left some unsprayed. Now, we had, as you all know, a severe cold spell towards the end of January following which we made counts of these Elberta buds. In the unsprayed plot there was 35 per cent. of injured buds and 65 per cent. of live buds, plenty for a large crop, while on the fall lime-suphur sprayed trees there was 98 per cent. dead buds and 2 per cent. of live buds only.

GRAPE CULTURAL PROBLEMS

F. E. GLADWIN, Fredonia, N.Y.

Quite a bit has been said here to-day regarding quality and advertising of your fruit. That seems to be an all important question this winter in various fruit sections. Before I came here yesterday afternoon I attended a meeting of representatives of different co-operative associations and shippers of grapes in western New York. At that meeting the matter of quality and grading was much discussed, and I am glad to state that without exception that group of men endorsed a grading of New York grapes next year. They propose to adopt voluntarily the United States standards for Concord grapes and to follow that with the introduction of a law compelling grapes to attain or to be packed according to a certain standard. The law cannot be put through the legislature this year, but the growers of grapes of New York State recognize there must be something done with reference to standardizing the package of grapes that goes on to the market.

Another project which was much discussed was that of advertising. That, of course, is a large matter and cannot be disposed of as easily as grading, but it eventually will come. Now, of course, the adoption of certain standards for the packing and shipping of grapes implies that you must have the quality of grape that will conform to the standard laid down, and this means the elimination of a part of the acreage in any locality in which standards are adopted.

There are always those who will fail through indifference, those who will not care for the vines the way they should, and so a premium is being placed now, so far as New York State is concerned, on the production of good quality of fruit, and this is as it should be.

What are some of the necessary things that one need do in order to insure good quality fruit? I think you will all agree that the best grapes are not produced in the vineyards which are not well tilled or cultivated. Occasionally a crop will come through under such conditions, but rarely will such a crop be produced two years in succession. Now, as to what comprises good cultivation is a difficult question to answer. What, to my way of thinking, might be good cultivation for the average Concord vineyard might not appeal to you. It is an individual matter. If after several years we hit upon a plan that we like, that does not necessarily mean that is the only plan of cultivation that will succeed or is succeeding. Local conditions, types of soils and various other factors all enter to determine which method of cultivation should be used. Personally, we prefer to plow once a year with the heavy soil types and on soils that do not wash during the winter; I prefer that plowing to be done during the fall after the leaves have dropped. Personally, I prefer that plowing to be done up to the vines at all times. I like to follow plowing to the vines with the disc, discing away gradually until the soil is level again. Then to follow during the summer with the scuffler or harrow, which will keep the soil fine and weed growth down. After due time I like to clean out under the wires with the horse hoe, and if I want a particularly fine job to be done, a job that will be a credit to show my neighbours and visitors, I like to hand hoe. I prefer this practice so as to keep the soil fairly well stirred and the weeds down until such time as the green manure crop should be sown, which in western New York is from the 20th July to the 1st of August. From that time on, of course, no work or cultivation of any kind is done. Now, briefly, that is the method that I like to use. It might not apply to your condition at all. It is simple; it does away with one extra plowing, which many growers think is necessary. I think, in many cases, the grower is perhaps cultivating too much during the growing season, and that is the trouble in a great many of our New York districts. They depend on cultivation for their fertilization and they have failed because they have not fertilized with commercial fertilizers or stable manure. I believe the grower must cultivate, must do this operation to the extent that I have outlined in order that he should have the highest percentage of grapes that will go into U.S. No. 1, and by the way that U.S. No. 1 grade is not particularly strict. Most of you could conform to it; most of our growers in the average season could put the greater portion of the crop into that grade.

There is something more needed than cultivation, however. During the past several seasons we have been endeavouring to learn what that something is. About eighteen or twenty years ago I was privileged to interview some 500 growers of grapes in western New York, visiting them on their farms and at many times while they were working the vineyards, and taking down a record of what they had been doing in the way of cultivation, fertilization, the growing of cover crops, spraying, the sort of fertilizer they had been using, the kind of cover crop they had been using, and how the crop had been harvested. I was greatly surprised at that time to learn of the great diversity of fertilizers that were used and the great irregularity in spraying and all that sort of thing. Where one grower would tell you that he had used for the past several years a certain fertilizer of a certain analysis and he was perfectly satisfied that particular fertilizer had given him a greatly increased crop, across the road his

neighbour would have used the same material, the same composition, and he would tell you it was worth nothing. It was rarely that the opinions of two men agreed in any one particular. So we agreed that one of our first duties was, if possible, to learn the requirements of the vine in that particular region so far as tne particular fertilizer needed, and after eighteen years we feel that we have got something that is indicative, at least, of the principal element of fertility that the vine uses and needs most. To sum up the work in fertilization for the past eighteen years, I will briefly give you the following facts: We find that while the vine uses a large quantity of potash and a fair quantity of phosphoric acid, it uses a still greater quantity of nitrogen, and nitrogen has been the element that has been the least supplied in the soils where grapes are grown in western New York. We find that quickly available nitrogen, as nitrate of soda, does materially increase the quantity of fruit borne and the amount of cane and leaf growth. We have been in recent years using other fertilizers, such as, for instance, ammonium sulphate. These experiments are still too young to report on definitely, but we do hope that we will find materials as good as nitrate of soda which can be bought at a lesser price.

Now, there is quite a controversy at the present time—largely in the newspapers—amongst growers in western New York as to the fertilizer needed to properly ripen the Concord grape. You know the idea several years ago was that potash was much needed to ripen fruits. Many of you have probably used potash at some time or other to put colour on your peaches, and so we have been told in years gone by that potash was much needed to ripen grapes, particularly the Concord. We have learned in these days that no fertilizing material so far used has apparently contributed very greatly to the ripening or to the colouring of the fruit. We think we can see that the vines that have a good healthy leaf as a result of nitrate fertilization do have a little heavier blue bloom; that, however, might be chiefly in the eye, but we think we have noted it from time to time and I would like you to believe that such is the case. We do know that the Concord berry is larger under nitrate fertilizer than under potash or phosphoric acid, but I do not believe from our experience, from our tests, that any fertilizing material is going to greatly increase or hasten the ripening of Concord grapes. We have found, however, that potash does have a little effect in the amount of crop-production, very slight. In fact, if I were to choose I would rather put the money that would be needed to purchase the potash and buy a little extra nitrate of soda. That would show a greater return financially than the use of a few pounds of potash. Thus far we have not been able to trace the effect of phosphoric acid in any way whatever in the production of fruit or wood. In short, 300 pounds of acid phosphate applied annually has never influenced in the slightest the cane growth, the amount of leaf or the amount of fruit borne, but we do find that the use of phosphoric acid in the form of acid phosphate does materially aid the green manure crop which we are going to turn under. In other words, acid phosphate does materially help the growth of rye, barley, oats, golden millet and several other crops that we have used as green manure crops.

Now, a word as to the quantity of nitrate of soda that has proven effective in these tests. We have applied annually 250 pounds of nitrate of soda per acre. This is being applied previous to the plowing. If the plowing is done in the fall, we leave it until the first cultivation or the first discing in the spring, but if the plowing is done in the spring the nitrate application is made along with the 300 pounds of phosphoric acid just before the plowing. Now, as to whether the 250 pounds of nitrate of soda is the best amount to use is open to

question. Some of our leading growers are using as much as 500 pounds on certain soil types, and they are getting results. I do not believe, however, that that quantity is needed on most of our soils. It is possible that 300 or 400 pounds might be more valuable, more profitable than the 250 pounds. That is a matter that the individual grower will have to determine for himself. Now, ordinarily, experiments or tests having to do with soils have a rather limited application. For instance, I am over here in Ontario talking about fertilizer tests in New York right across the lake; it is a long way around and you may be wondering has this any application here. The thing that has struck me in all the tests is the rather wide application that these tests have had, from the newer grape section of Missouri and Arkansas, the Ozark Mountain section of those States, right on down through Michigan, Delaware, Massachusetts and New York. These all show that the grape is a big feeder in nitrogen and that the real benefit comes in having that nitrogen available early in the spring. I think one of the reasons why we have got an unbalanced condition with the Concord vineyard where stable manure has been used year after year is from the fact that the nitrogen there is not available early enough in the season. We get a tremendous wood growth because the nitrogen becomes available later in the season, but with quickly available forms of nitrogen, such as nitrate of soda, we get that benefit early in the spring when the vines are in blossom and need the stimulant.

Now, we come to the matter of pruning and training. I am thoroughly convinced after several years' work that we have not been retaining enough leaf on the average vine through our methods of pruning to thoroughly ripen or thoroughly develop the fruit to its best. Several years ago we attempted to correct this very close pruning by leaving on many spurs. In recent years a great many experiment station workers have been concerned with the location of the best fruit buds on the Concord vines. In other words, where are the most productive buds on the cane? After several years they came practically to the same conclusion, that the lower bud on the cane is rather poor, the second one a little better, and so on until we get to the fifth or sixth buds. Then for a number of buds, say up to twelve, the buds were good fruit buds, and then from there on there is a gradually dropping off again. However, the grape grower of western New York determined that for himself because he put his wires 34 inches apart as he found that in such distance about ten or twelve buds would be accommodated. He didn't go into the scientific reason of it, but he placed his wires to accommodate the buds that he believed from personal experience were the best fruit buds. I believe that we can well leave a number of spurs, two bud spurs, on our vines after we pruned them to the requisite number of canes, and that the vine will be better by so doing. We used to go through, after growth had started, and break off all suckers coming from down near the ground after they had reached the length of a few inches, twelve or eighteen inches. We don't do that any more. We leave those suckers because, as you men know, the leaf is the manufacturing part of the plant, and we believe we are gaining additional leaf space from leaving those spurs and suckers. They can be removed at the end of the growing season and a fresh crop of green leaves will grow next year.

As to the severity of pruning. Considering the cane growth and the fruit produced from several hundred vines over a period of years, we are convinced that the vine which will prune away from a pound and a half to two pounds and a half of cane and still leave from forty-five to fifty-five buds for fruiting, is the most productive vine. In other words, the vines within those ranges,

vines that will prune that amount of cane each year and vines which, after taking away that wood, still have forty-five to fifty-five buds, have shown themselves to be the most productive vines over a number of years. A vine that won't prune a pound and a half of cane growth year by year is really unprofitable.

It would seem at the present time that the single-stem four-cane Kniffen is the best method for training the Concord, the Niagara, the Worden and the Delaware. Those four varieties have done their best with us over a period of years when trained to that method. Not that we have gotten a greatly increased amount of fruit by reason of that method, if any, but because of the many advantages that method of training offers; first and foremost of those advantages is, I think, that one has so many opportunities for the growing of fruiting wood for succeeding years. Then, the air drainage is a big consideration in this method of training. The fact that new growth is kept away from the tools of cultivation is a distinct advantage. The fact that when we get a better air drainage there is less mildew. Where this method of training is used there is considerable difference in the readiness with which spraying can be done, and after the pickers get used to harvesting from this type of training they like it better than most other methods. Possibly there is a greater strain placed upon the trellis wires on the posts under this method than from some of the other methods that are lower down, specially in case of high winds and so forth, but the many advantages greatly outweigh any disadvantages. There is quite a difference, too, in the sugar content of the fruit. As the fruiting wood is raised there is quite a difference, running as high as 10 per cent. in some seasons, between the fruit borne on the two wires of the Kniffen method, the fruit borne from the canes on the upper wire running considerably higher, ordinarily, than the fruit borne on the lower one.

Regarding the matter of spraying, I think Mr. Ross at Vineland has covered that pretty thoroughly in previous years and is still working on those problems. We have some troubles that you do not have over here and I think you have some over here that we do not have, but the necessary requisites are: good cultivation, necessary and intelligent fertilization, conservative pruning, the use of a method of training that is in conformity with the growth habit of the vine, and timely spraying.

If there are any questions I will be glad to discuss them at this time for a few moments.

Q.—Is there any advantage between the one-cane Kniffen and two-cane? A.—The one-stem four-cane Kniffen, for some reason or other, year in and year out has given us better results.

Q.—What green manure crop do you prefer? A.—I will tell you what we prefer, but you might find you have some crops that grow here before. After several years we believe the golden millet is one of the most desirable.

Q.—Is that the Japanese millet? A.—There is Japanese millet and German millet. I thought at one time I knew the difference between them; but the millet that we use grows taller than the Japanese millet. The golden millet seems to give a larger stem. Barley has proven a very desirable crop and we find in some seasons we have obtained good crops with winter wheat; but we hit generally upon golden millet as the crop we use year in and year out.

Q.—Why do you emphasize millet instead of clover? A.—As a rule a leguminous crop is a crop that starts very slowly in the spring with us. We want to get our plowing done before we can get a stand of clover or vetch to make it worth while. Once in a while a crop of clover will be grown that is really worth while to turn under, but it is the exception. Then, too, the cost

of clover and vetch seed went so high that it made those crops pretty costly and we found we could provide the necessary nitrogen much more cheaply with nitrate of soda than we could through the crop.

Q.—Have you tried sweet clover? A.—Yes. We have tried biennial and annual. The annual gave us very good stand before the first frost, but the biennial heaved badly with us. The annual clover grows very well, one season to twenty-four inches before the first frost. If you can grow it and the price is still reasonable, it is a desirable crop.

Q.—What effect has lime on crops? A.—Lime was used at the rate of a ton per acre on three-year periods has proven disastrous. Apparently it has checked the ripening of the fruit and it has seriously interfered with the growing of the canes. Now, a small amount of lime does not have that effect.

Q.—Grapes prefer an acid soil? A.—Yes, apparently so.

Q.—Would you use more nitrate on poor growing varieties, like Moore's Early? A.—I don't believe you are going to quicken that variety by the additional use of nitrate. That is something that is inherent in the variety. We thought at one time we could increase the vigour of many weak-growing varieties by grafting. We can increase the vigour of some varieties by so doing, but there are some varieties that are too weak to be benefited by grafting them on root stocks. The variety itself that is used as a scion must have some vigour in itself.

Q.—What do you think of barnyard manure if you can get it? A.—I think if one had access to a supply of manure that he would still be justified in using a small amount of nitrate of soda for that early pick-up that I have spoken of before. That is, I like to believe there is some nitrate available in that soil when the vine is in blossom and I am pretty sure such is not the case if one is dependent entirely upon barnyard manure for his source of supply. Now, over a period of years on heavy soil types the cane growth has been about the same where we used barnyard manure and nitrate of soda, a cover crop and acid phosphate; the fruit has been a little less under those same conditions from the use of barnyard manure. But on the lighter soil types the vines that had stable manure over a period of fifteen years were very much below those vines that had nitrate of soda, acid phosphate and a cover crop for the same period.

Q.—How do you recommend spreading nitrate of soda? A.—Over a large area the best way would be to use a horse sower, for a small sized acreage it could be readily done by hand. The entire area of the vineyard, as far as it is possible, should be covered by the material because the root area is penetrating throughout your whole acreage.

REPORT OF TRANSPORTATION COMMITTEE

MAJOR ARMAND SMITH, Winona

In the first place Major Wheeler, your fruit transportation specialist, has been unable to attend this meeting to-day because he is undertaking some very important test work down in Montreal.

Last year at this time when your committee was appointed it was estimated then that the Railway Board would bring in the new freight rate structure and we expected a very important year in the matter of freight and express rates. We thought possibly we would have to do a certain amount of defending of our rights and go before the Railway Board on that matter. However, the

new freight rate structure was not issued, as you know, by the Railway Board, so this year has been comparatively quiet. We expect the new rates will be given out sometime during this coming year and whoever your committee, it is very important they should be on the job.

As I said, we have had a comparatively quiet year but there have been a few smaller matters that your committee has acted upon and I think brought to a satisfactory conclusion. Possibly I might enumerate one or two. The old rate on mixed cars of fruits and vegetables said that whatever the variety was that the rate which would apply would be the highest rate. For instance, if there was peaches and plums in the car and plums took a higher rate than peaches, if peaches were put into that car, they would take the plum rate. A number of your committee saw Mr. Ransome of the Freight Traffic Association in Toronto to see whether we could not have each fruit or vegetable take its own rate so it would increase the consumption of those different varieties and also eliminate some possible dishonesty that might occur in people putting a higher rated fruit or vegetable underneath the lower rate grades in the bottom of the car. So we presented our case before Mr. Ransome and had the satisfaction of hearing that for 30,000 pound minimum of mixed cars of vegetables and fruits that each commodity would take their own rate; especially to Burlington and Aldershot, where they ship so many vegetables, that has been of considerable assistance.

Another point was that when December 1st came along express rates then went up to the second class and it was felt that a certain amount of hot-house fruits or vegetables or apples by the box for Christmas presents could be shipped by express if we had a lower rate in the winter months. This case was also presented and the railways met us quite fairly giving us a rate, but 25 per cent. lower than the former rate, commencing December 1st. It might not seem much to you but this is a considerable drop over the second class rate we had before.

With regard to the business to be gone into this coming year, the vital matter is that of the new freight rate structure but there are other points that your committee has brought up. One, for instance, is that we are going to ask Mr. Ransome of the Freight Traffic Association for a lower export rate on certain varieties of fruit, such as plums. It is possible there might be a market for plums every year as was the case this last year for export. At the present time the fruit carries a very high rate and we are going to see if we can get a lower rate for export only so that we can get rid of some of our excess plums.

ROUND TABLE CONFERENCE ON SMALL FRUITS

MR. MACOUN: I understand that this round table conference has been put on with the object of giving every member of this Association who is here an opportunity of giving their experience in growing different varieties of small fruits and tree fruits; an opportunity which they very often do not have when one or two speakers occupy the whole of the time. The idea of these round table conferences is there should be somebody to lead in the discussion for a few minutes and then everybody have an opportunity of asking questions and giving their experience with the different varieties.

We think that the time is coming when there will be just as much discrimination in quality of small fruits as there is now in the apple and some of the other

fruits. As you know, up to the present time very little discrimination is shown by the purchaser when buying small fruits. They buy the strawberry no matter what variety it is, or the raspberry, gooseberry or currant. But I am one of those who believe the time is coming very rapidly when the consumer will ask for a certain variety of small fruit because there are so many at work breeding new varieties, that before very long we shall have small fruit varieties that are leaders and that will be excellent in quality, and those will be the ones that the consumer will soon know. Therefore, these discussions will possibly bring out any facts connected with some new varieties that are now available and are of very good quality. I am going to ask Mr. Ed. Louden to lead the discussion on raspberries.

RASPBERRIES—ED. LOUDEN, Hamilton

For pretty nearly a generation, the raspberries that have been grown have been confined to about three varieties: the Marlborough for early and the Cuthbert and Herbert for the later ones. The last few seasons the early berries have been bringing very much better money than the later ones. The earliest variety I have is the St. Regis. Every year I have got crops and good prices for them, both spring and fall, but I have only known one other man that has succeeded with them.

Q.—Is that the Ranier? A.—Yes, the same thing. Most people failed and think that the nurserymen ought to be hanged for selling it, but it is a matter of getting the right conditions. I don't know that I know what they are because they behave differently under different circumstances. I have not been growing Marlborough for some years, as it was so crumbly, and have replaced it with the Otto. It is a nice looking berry, handsome, and gives a better cane growth than the Marlborough. I have been growing it quite successfully, and think highly of it. It comes very early and succeeds well everywhere, is very hardy in fact, perhaps the hardiest of raspberries.

I have not been growing the Brighton, someone else will have to tell you about that. Coming down to the later ones, the Cuthbert and Herbert have been the main crop. Some people like Herbert, they give a good crop but the berry is a little soft, while others think there is nothing but Cuthbert. Within the last few years there has come the new berry from the Vineland Station, the Viking. As far as the fresh fruit market is concerned, I am positive that it will put the Cuthbert or Herbert or any of the older kinds absolutely out of business. The Cuthbert might be better for canning but I cannot see it for selling on the fresh fruit market. The Viking is a larger berry, quite a shade larger, grayish purple in colour, which is a distinct advantage, and it has a kind of a gloss to it, more so than any raspberry I know of, which makes it very handsome. On the fresh fruit market last summer we obtained just the same price for pints of Viking as we did for quarts of Cuthberts and sold just as easily. That was for a limited quantity, of course; anyone who was selling in a wholesale way would not get that margin but they would get some difference. It is one of the firmest I have been able to observe. I know of growers that held some to see how the fruit stood up and they were more than pleased. The fruit was held for a couple of days and were in grand condition, very much better than Cuthberts with similar treatment.

Q.—How do you think it is going to compare in yield with the Cuthbert? A.—It is better under our conditions. The growth is much better, it does not [illegible] It is much sturdier, in fact, sometimes you would think

you had young fruit trees. They are exceedingly stout at the base. The other berry that we have grown, and which we think very highly of, is a berry from Minnesota, the Latham or Redpath. It is the largest and heaviest cropper that we have. It crops heavier than the Viking but it is later and in this section especially, when there is enough of the Viking planted, the price will be down when the Latham comes on, so it won't be so desirable. It is very late, later even than the Cuthbert. It holds its size better than any berry I know of; the last ones were as large as the first. That was our experience last year. It is not as glossy, but about the same colour as Viking.

I think that covers the red raspberries very well that we have had experience with. We grow one purple called the Royal Purple, which has only a limited market. We get good prices, slightly better than we do for any of the others for canning, from those who like them. The Royal Purple grows about the best bush of any I know, and does not sucker.

We are not growing very many black caps at the present time. When they first came out I had some Honey Sweet. Mr. Macoun was speaking about quality in variety. They were certainly the finest I had in quality but for some years the berries petered out and I went out of them.

Q.—Have you ever tried Plum Farmer? A.—Yes, it is a very good berry. we like it well, especially on light gravelly ground. It is a grayish blue, more than the others. It looks very nice when the berries are fresh but the fruit gets kind of sick looking if they stand.

Q.—How do you find Viking for killing back? A.—We are not troubled with any variety killing at our place very much; I don't know whether I am lucky or not. I have a suspicion that a lot of killing back is due to diseased stock.

Q.—Of course, this last winter we had a very severe frost, as you remember, and my Herberts and Cuthberts stood up all right, only went back a few inches, bnt the Viking went back very badly. It was just that severe spell we had; some of the canes were killed right out entirely, but before that they stood up well. A.—We have not had the slightest injury on them and I have not heard anyone before speak of that.

Q.—How are you keeping ahead of disease? A.—Take it out when it gets in.

Q.—Have you any idea what soil conditions would be detrimental to root gall? A.—My experience is that on heavy land and black soil, root gall flourishes very much. I have never been troubled with it on the lighter soils. I don't believe root gall does a lot of damage unless it is bad. Of course, I have seen it so bad it would climb up the cane. As long as it stays in the roots I don't believe it damages the plant so badly.

Q.—Have you mosaic among each variety every year? A.—No, I have only found four or five plants, for instance, of Herbert all the time I have been growing them, that had mosaic.

Q.—What about pruning? A.—As far as St. Regis is concerned I never head them back. My experience has always been if they are headed back at all that they grow more suckers and produce smaller berries than if they are left to fruit along the whole cane.

MR. PAUL FISHER: I would like to ask Mr. Macoun to tell us a little more about the Newman.

MR. MACOUN: There must be others who have had varieties under cultural methods and will give their experience of them. The Newman variety was

originated by Mr. Newman near Montreal; that variety has proved very hardy, a very good cropper and a good shipper, a splendid canning berry. I won't say it is better than the Cuthbert but the Cuthbert is too tender for Eastern Ontario and Quebec. I am surprised that Newman has not made better headway here.

With regard to the Latham, which Mr. Louden spoke of, we find that has not quite so good quality as Cuthbert; I would not advise any great planting of it, where one is growing others successfully. The Otto, which Mr. Louden referred to, is a very hardy sort which originated at the Agricultural College, South Dakota. It is an early variety and I would advise any who want to try the early sorts to try some of Otto because the quality is good for an early variety.

Mr. Louden referred to our varieties, the Brighton and Comet, which are very early sorts but we are not quite satisfied with the quality of them, though they produce very well.

MR. PAUL FISHER: I would like to ask Mr. Palmer what he knows about the Newman.

MR. E. F. PALMER: We have been growing them at the station, of course, and under our soil and conditions it does not grow well as we would like. We would not recommend it where Cuthbert can be grown.

CURRANTS AND GOOSEBERRIES—PAUL FISHER, Burlington

While we have grown quite a lot of currants and gooseberries at various times and we now have quite a lot, we have not had a great experience in the different varieties. About ten years ago Prof. Macoun sent me several bushes each of about six new varieties which he had, including the Kerry, Saunders and Magnus. We grew them in the garden for a number of years and while I think some of them outfruited the Champion, which we are growing exclusively for the black, they didn't any of them seem to fit into our system as well as the Champion. Some of them had very much larger individual fruits, some of them had larger clusters but they all ripened earlier, and with us that was a disadvantage. We use our black currants more or less as a source of providing work for our pickers when we don't happen to have anything else to pick. If we don't have cherries or raspberries for the day why the pickers go out and pick currants. In that way our black currants remain on the bushes for sometime. I think I am safe in saying the period would extend over three weeks in any normal year, and we found Champion had that quality of remaining in that condition and was saleable in that length of time. Of course, anyone who is growing black currants with another object in view might find some of these other varieties desirable and I have no doubt that Prof. Macoun can tell you about them.

I would like to say one or two words about the culture of the black currant. It is very desirable that it be fertilized pretty heavily in order to get good growth and the constant removal of old wood. Our chief difficulty has been in keeping down the borer, and if you do not continually remove the old wood you will find it exceedingly difficult to remove the borer at all. The last patch we planted we cut off everything that was above ground except one bud on each of the two or three shoots we left; in that way we still found 10 per cent. with borer in

If you leave one or two buds on each stock you will get sufficient growth any way, and I think it is desirable to assure yourself you are not planting any borer.

MR. MACOUN: I might say that the Kerry is the most productive variety we have found at Ottawa. We have the Kerry, Climax, Saunders and Magnus that are very attractive and good in quality. They might be too early for some growers.

MR. HARKNESS: How much earlier would they be than the Champion?

MR. FISHER: I would say they would be a week earlier than the Champion. We found, however, they were not only earlier but they would not hang on, and if we did not get the pickers to pick them within a week or ten days that they began to dry up and were not saleable.

Q.—From the canners' standpoint how do they compare? A.—I don't know of any discrimination as to these varieties by canners. I think if anyone is prepared to pick them at the time they are ready for market they might be desirable berries.

I might say that we planted Boskoop Giant for a few years; they are very good berries and very early.

Q.—Have you tried Naples? A.—It is a good many years since we grew Naples. They grow a very big bush but we didn't get the yield out of them as we did with Champion.

Q.—What do you think of steamed bone for fertilizer? A.—We have been applying nitrogen in one form and another, yet if you apply steamed bone it is transferring the nitrogen in a large percentage to phosphorous and we are not prepared to say that it pays to spend your money on phosphorous. Our soil is pretty heavy soil and we think nitrogen is the most profitable source of spending our money.

MR. HARKNESS: A number of years ago when I started in with black currants I bought my stock from the nurserymen and I found after four or five years that it was not very uniform. So I went through my plantation and marked the plants which gave me a good crop of good berries. I took into consideration three things: The growth, size of crop, and size of berry. After going through two years and after finding I had marked the same plant twice in succession, I took the cuttings from these plants and grew my own cuttings. Now I have a very uniform lot of plants, lovely berries and good quality, easily picked and they hang on well. These were all taken from Black Naples, which I found did as well with me as anything.

With reference to the Magnus, Climax and Saunders which Prof. Macoun sent me a number of years ago. The Magnus is an early berry and I grow a number because I only grow the Cuthbert and Herbert raspberries and the Magnus comes in with the first pickings of these berries, so we can run the berries and the black currants at the same time. The Saunders and Climax did not do nearly so well with me as Magnus. I am confining my growing now to the Magnus and the Black Naples. Black Naples is my principal berry. I have never grown the Champion but I have had the Victoria and two or three other black ones, but I am quite satisfied with the two varieties—a large quantity of Naples and a small quantity of the Magnus.

Q.—Can you pick your Naples all at one time? A.—I don't pick my Naples at all until my raspberries are all off and then they are all ready to pick.

Q.—Are you sure they are Naples? A.—That is what I bought them for.

Q.—Is there any export market for currants; they carry all right?

MR. FISHER: As far as I know it has never been tried. I don't think we grow enough of them. We would have difficulty in loading a car load of black currants possibly at our shipping points.

If there is nothing more on the blacks, we pass on to the reds. We are only growing two varieties, the Cherry and the Fay. We follow the same cultural practice. You don't get as much borer in the reds as you will in the blacks, but you will get some unless you fight it. Here again in planting we cut off all our top when we put it out and make sure we have removed all the borers that are there. I have no doubt that what Mr. Harkness says about selecting your plants would be advantageous to any grower. I imagine it has not been the idea of nurserymen or anyone else to do any selecting with the idea of improving the strain.

I think the Fay gives the better crop and Cherry gives a better berry. If there are any more new varieties I don't know of them. You will have to ask Mr. Macoun and Mr. Palmer about them.

Q.—Do you like the Perfection?

MR. MACOUN: The Perfection is a large red currant which is much hardier than the Cherry and Fay. Of course, hardiness is a consideration with us at Ottawa.

MR. PALMER: The best varieties are so hopelessly mixed that nobody knows what they are, and while we think they are supposed to be Perfection and Cherry and Fay, we are never certain. If what we have is Perfection, it is a good variety.

Q.—What about the market for reds?

MR. LEON SMITH: I really must confess I am not very familiar with it. As far as our own factory is concerned we use a limited quantity only of black currants.

Speaking of Perfection, I don't know what the experience has been in Ottawa, but in our fruiting patch we have Perfection, Cherry and Fay. We find in the case of Perfection the plant is a very much poorer grower: it does not produce the amount of wood or cane that the others do.

MR. MACOUN: As you know we have been testing gooseberries for a good many years at Ottawa, and I think perhaps two of the most outstanding ones are Clark and Poor Man. The Clark originated at Burlington and is a very outstanding variety. If it continues to do as good as it has done during the last few years it certainly will be one of the best to plant. We find the Poor Man a very satisfactory berry, large and very attractive. These two, I would say, are the most outstanding. The Clark is perhaps more of a European type than American. The Poor Man is the American type, probably a cross between an American and English. As you know we have originated a spineless variety of gooseberry; starting with a white variety as large as a pea and we hope soon to have one as large as the Clark and Poor Man and then you will have something that will be worth while growing.

Q.—Has Clark more resistance to the mildew? A.—At Ottawa it has resisted mildew during the two years we have had it fruiting, but those years have been cooler and you cannot tell whether a variety will resist mildew until you get a warm season.

MR. FISHER: I think we ought to ask Mr. Palmer to tell us what he knows about the Clark.

MR. PALMER: We had the Clark under test at Vineland for ten or twelve years, maybe more, and six or seven years ago it more or less forced its good qualities on our attention. It was so much superior to any American or European variety under our conditions. Apart from the large size of the fruit the main thing about the variety is it is what we call a drought resister. It makes a large vigorous growth and the foliage remains on during the season; it has not the tendency to drop its leaves as most European varieties. It has vigorous growth and large fruit. We made certain recommendations at that time and I think these recommendations have been justified by the performance of the variety.

Q.—What is your opinion of the dessert quality of the berry? A.—From the commercial standpoint I don't think it is much better than the Poor Man variety which Mr. Macoun mentioned, but for gooseberry pie it does not make much difference.

STRAWBERRIES—W. M. FLETCHER, Clarkson

I can safely say that the strawberry is the main crop in the Clarkson district. It is not a very large district, starting east of Oakville and running through to Dixie. We have recently incorporated under the new name of the Clarkson and Dixie Co-operative Fruitgrowers, Ltd. We don't sell co-operatively but we buy all our supplies, containers, fertilizers and spray materials and so on.

With regard to varieties of strawberries, I venture to say that 99 per cent. of the berries grown in our district are the Glen Mary. The general consensus of opinion is that as a producer and money maker, we know of no berry to take its place. The objectionable thing about the Glen Mary is the green tip, but where we have good growing conditions, where the land has been heavily manured, well cultivated and kept clean, and the foliage gets to a height of twelve or fifteen inches, the Glen Mary will ripen all over, at least we get a much better berry and is more saleable and will command much better prices. Since 1924 we have not had what we call a 100 per cent. crop. Last year we consider we had a 60 per cent. crop.

Now we are looking for a better berry than the Glen Mary and we are anxiously waiting for somebody to produce an all red berry that will satisfy those people from the city who wants an all red luscious fruit. This year Mr. C. R. Terry, our president, has obtained from the O.A.C., Guelph, a lot of different varieties to test them out on our soil and see if we cannot find a better kind. I am really glad to know that the Fruit Departments of both governments are doing so much for the fruit growers in our Province, and in this way I have no doubt that in time to come we will obtain a berry that is superior to the one that we think so much of at the present time. I suppose more money has been made out of the Glen Mary than from any other known variety, and therefore that is why we stick up for it; yet at the same time we are looking for a better all red berry; one that will produce well, crop well, and will satisfy the taste of the general public.

Q.—What is the prospect for next year? A.—I don't think they are as good as last year. I think in our district we will not get over 50 per cent. crop. There are always exceptions to that of course, but in speaking to quite a number of our growers they all say the prospects are not so good.

SOME ASPECTS OF SPRAYING MANAGEMENT

W. C. Dutton, East Lansing, Michigan

We ordinarily think of spraying in terms of control of pests, and that is only natural since control is the ultimate aim of all spraying operations. On the other hand, I wonder how many growers think of spraying as a problem in orchard management and study it with the idea of doing it in a rapid and economical way and at the same time obtaining the desired control. The general problem of spraying management involves many factors such as the size and capacity of the sprayer, convenience of water supply, one or two men spraying on each outfit, guns or rods, spraying from the ground or from the sprayer, completing the tree or spraying with the wind and so on. These points are all very important but are not the ones that I am going to discuss with you.

In choosing a material there are three considerations that are of outstanding importance. The first requisite is that it shall be effective in the control of the insects or diseases for which it is used. The second consideration is the production of fruit of good finish, i.e., free from russeting, blotching and burning. The third consideration is foliage injury, and it will be sufficient at this time to say that foliage injury is undesirable. These factors are all important because they have a direct influence on the grade or quality of the fruit or upon the productiveness of the tree.

In recent years there has been a tendency to reduce the strength of some of the standard spraying materials used for the control of apple scab. There have been two reasons for this: (1) the desire to reduce the cost, and (2) to eliminate, as much as possible, russeting of fruit and injury to foliage.

Even with an acceptable material there is an unsettled point as to the amount of dilute materials necessary to insure satisfactory control. This may be termed "dosage." The general tendency has been to increase the dosage, but with such increases there immediately arise certain economic considerations. Heavier applications not only entail increased costs for material and labour but reduce the acreage that it is possible to cover with a certain equipment.

When the strength of materials and dosages are considered together a number of very interesting questions arise. Will spraying materials used at strengths weaker than generally recommended give satisfactory scab control? Will increased strength insure better results? Is there danger of over-spraying? Which is best, a light application of strong material or a moderate application of medium strength material? These questions apply not only to scab control but to foliage injury and finish of the fruit as well. To obtain answers to these questions a series of tests was carried out in 1924 in a twelve-year-old orchard of Hubbardston and Jonathan. During that season conditions were unusually favourable for scab development and this condition coupled with careful timing of applications resulted in a very critical test for any material or method of application.

Materials and Strengths at which they were used.—Two materials, Bordeaux and lime-sulphur were used. Lead arsenate powder was added in all applications except the prepink. The materials were used at different strengths which have, for this experiment, been termed *weak*, *medium* and *strong*. These terms are only relative and strong lime-sulphur as used here does not refer to dormant strength lime-sulphur. The amounts or formulae used were as follows:

Bordeaux.—Weak, 2-4-100 plus one pound of lead arsenate.
Strong, 6-12-100 plus three pounds lead arsenate.
Lime-sulphur.—Weak, 1½ gal. in 100 plus 1½ pounds lead arsenate.
Medium, 2½ gal. in 100 plus two pounds lead arsenate.
Strong, 3 gal. in 100 plus three pounds lead arsenate.

Dosage and Methods of Application.—The medium strength lime-sulphur was applied in the usual way and the trees received what may be termed a moderate application. The weak and strong lime-sulphur and the weak and strong Bordeaux were each applied at three different dosages. These have been termed *light*, *moderate* and *heavy* applications. The spraying was done in such a way that the moderately sprayed trees received approximately twice, and the heavily sprayed trees three times as many gallons as those lightly sprayed. The relative amounts, then, were as 1, 2 and 3. This ratio of dosage is of course only approximate but a record of the actual dosages shows that it was closely maintained.

Comparative Amounts of Active Ingredients.—So far there have been two factors introduced which might effect results. They are strength of material and the rate of application. When we consider these two factors together a third one is introduced which is equally as important as the other two. This may be referred to as the amount of active ingredients applied with any combination of strength of material and dosage. For example, the comparative rates of applications were as 1, 2 and 3 and with the lime-sulphur the strong was twice as strong as the weak. By considering the two together we can determine the amount of active ingredients applied. For instance, the rows sprayed with light applications of weak and strong lime-sulphur received equal quantities of dilute material but the row sprayed with the strong received twice as much actual lime-sulphur as the other since the dilute spray was twice as strong. For another example may be taken the light application of weak Bordeaux and the heavy application of strong bordeaux. The trees sprayed with the heavy application received three times as many gallons of dilute material and since the strong Bordeaux was three times stronger than the weak, they received approximately nine times as much copper as those sprayed with a light application of weak Bordeaux.

Results.—Now that I have outlined the variable factors which may have affected results let us see what effect these conditions had on scab control, on foliage injury and on the finish of the fruit. The results are presented in tabular form in Table 1.

TABLE I.—STRENGTH OF MATERIALS AND RATE OF APPLICATION IN RELATION TO SCAB CONTROL, FOLIAGE INJURY AND RUSSETING OF THE FRUIT

Materials and dilutions	Rate of application	Comparative amounts of		Per cent. apples scabby	Russet per cent.			Leaf-fall per spur
		Dilute material	Active ingred.		Light	Medium	Heavy	
Weak lime-sulphur, 1½-100.	Light.....	1	1	23.0	7	0	0	1.8
	Moderate..	2	2	8.9	12	0	0	2.8
	Heavy....	3	3	5.1	13	0	0	3.8
Medium lime-sulphur, 2¼-100.	Moderate..	1.5	2.5	2.2	12	0	0	3.4
Strong lime-sulphur, 3-100.	Light.....	1	2	7.7	12	0	0	3.0
	Moderate..	2	4	2.9	27	0	0	5.1
	Heavy....	3	6	2.0	28	10	1	5.6
Weak Bordeaux, 2-4-100.	Light.....	1	1	19.9	38	50	7	1.1
	Moderate..	2	2	5.6	26	50	20	1.6
	Heavy....	3	3	1.0	12	52	36	2.6
Strong Bordeaux, 6-12-100.	Light.....	1	3	2.4	7	49	40	2.1
	Moderate..	2	6	0.3	4	33	62	2.1
	Heavy....	3	9	0.6	10	36	53	1.5

When these results are considered from the point of view of scab control, of russeting on the fruit and of foliage injury, we find some very interesting conditions. The relation to each of these items of strength of material, dosage and amounts of active ingredients is very definite.

Scab Control

Strength of Materials.—Strong materials in all instances gave better control of scab than weak materials provided the dosage was the same with both strengths. For example, with the light applications of the two strengths of lime-sulphur there was 23.0 per cent. and 7.7. per cent. respectively; with moderate applications there was 8.9 per cent. and 2.9 per cent. and with the heavy applications there was 5.1 and 2.0 per cent. for the two strengths. In every instance the stronger material gave a lower percentage of scab, but it is interesting to note that as the dosage was increased the strength of the lime-sulphur made less difference. The results from the moderate application of medium strength lime-sulphur are not strictly comparable with those from the weak and strong lime-sulphur because of the difference in the method of application. Better control in proportion to the amount of active ingredients used was obtained with the medium strength material because there was more uniform distribution of the material than with the special method used for the other materials. However, the results with regard to foliage injury and russeting of the fruit will be found to fit in very well according to the strength of the material and the rate of application.

The results in scab control with Bordeaux were very comparable to those obtained with lime-sulphur. Strong Bordeaux in every instance gave better control than an equal dosage of weak Bordeaux. Light applications of weak and strong gave 19.9 per cent. and 2.4 per cent. respectively. Moderate

applications resulted in 5.6 per cent. and 0.3 per cent. and with the heavy applications of the two strengths there was 1.0 per cent. with the weak and 0.6 per cent. with the strong. We again find, with Bordeaux, the same conditions as with lime-sulphur that as the dosage was increased there was less difference in control between the two strengths. There is only one conclusion that can be drawn with regard to strength of materials, which is that with equal dosage strong materials are more effective than weak but with heavy dosage there is much less difference than with light applications.

Rate of Applications.—A comparison of results in scab control from the point of the rate of application yields some interesting conditions. By taking each strength of both materials and comparing the different dosages of each strength we can readily see what relation the rate of application bears to scab control. First, with weak lime-sulphur, the light, moderate and heavy applications resulted in the following percentages of scab: 23.0, 8.9, and 5.1 respectively. Each increase in dosage gave a reduction in the amount of scab. With the strong lime-sulphur there was 7.7. per cent. with the light application, 2.9 per cent. with the moderate dosage, and 2 per cent. with the heavy dosage.

With weak Bordeaux the results were along the same line, the respective percentages of scab for the light, moderate, and heavy applications being 19.9, 5.6, and 1.0. With the strong Bordeaux the light dosage resulted in 2.4 per cent. of scab, the moderate in 0.3 per cent. and the heavy in 0.6 per cent. The order of control with the moderate and heavy applications is reversed from the expected but the control in both instances was so nearly perfect that this reversal cannot be considered as significant.

When the results were considered from the point of view of strength of material it was found that there was less difference between the two strengths as the dosage increased, and in a like manner it is seen that when compared on the basis of rate of application there is less difference between light and moderate, and moderate and heavy applications of strong lime-sulphur than between the same dosage of weak. The same conditions hold with Bordeaux, although in a less definite way.

Again there is only one conclusion and that is that with the strength of the material uniform any increase in dosage may be expected to lower the amount of scab until a point is reached where there is no further room for improvement.

Amounts of Active Ingredients.—There is still another basis of comparison and that is according to the amount of active ingredients applied regardless of the application. It was pointed out earlier that the amount of active ingredients used was determined by two factors—strength of material and rate of application, and study of Table 1 shows that it is possible to get equal amounts of active material in different combinations as with the moderate application of weak lime-sulphur and the light application of strong and again with the heavy application of weak Bordeaux and the light application of strong Bordeaux.

The comparative amounts of active ingredients will, for convenience sake, be referred to as "units," and we find that the one unit of lime-sulphur allowed 23.0 per cent. of scab, two two-unit plots had 8.9 per cent. and 7.7 per cent. respectively, the three-unit plot had 5.1 per cent., four unit 2.9 per cent. and six units 2.0 per cent. In every instance an increase in the number of units of active ingredients resulted in a decrease in the amount of scab. With Bordeaux, one unit allowed 19.9 per cent. of the fruit to become scabby, with two units there was 5.6 per cent., with two three-unit plots there was 1.0 per cent. and 2.4 per cent., and with six and nine units there were 0.3 per cent. and 0.6 per

cent. respectively. Here, as with lime-sulphur, the general statement may be made that an increase in the amount of active ingredients gave better control of scab, and the general conclusion is that the amount of active ingredients on the fruit bears a definite relation to scab control up to the point where control is practically complete and further increase in control is impossible.

Coverage and Concentration.—The relation of three definite conditions to scab control have been discussed and all of them have been found to bear a definite relation to the amount of scab present. As a result of these comparisons it is possible to state that there are two other factors which are results of the above named conditions, that have a direct bearing on scab control. They are what may be termed *coverage* and *concentration*. By coverage is meant the covering of the surface of the foliage and fruit with a film of fungicide, and concentration may be defined as the actual amount of fungicidal material in this covering film.

With a light application of weak lime-sulphur 23 per cent. of the fruit was scabby; but trees sprayed with a light application of strong lime-sulphur produced fruit which was only 7.7 per cent. scabby. In both instances the coverage was the same (see Table 1), each receiving one unit of dilute spray, but the concentration on trees sprayed with strong lime-sulphur with two units of active ingredients was double that on trees receiving a light application of weak lime-sulphur with only one unit of active ingredients. With the light application of strong lime-sulphur the coverage probably approached the optimum but the failure to get better control of scab was undoubtedly due to incomplete coverage. The nature of the occurrence on the trees supports this statement. The scab was present mostly as large spots and confined to small groups of apples here and there over the trees. This condition indicated that those particular apples had not been covered at some critical application. With the light application of weak lime-sulphur the nature of the scab occurrence indicated clearly that coverage was incomplete and also that the concentration was too low, as scab was severe and generally distributed over the trees. A similar comparison might be made with light applications of weak and strong Bordeaux.

A study of the results obtained from heavy applications of weak lime-sulphur and strong lime-sulphur yielded further evidence. Both received the same coverage with three units each of diluted material. The use of the weak lime-sulphur with three units of fungicidal material, however, resulted in 5.1 per cent. of scabby fruit, while the strong with six units of active ingredients reduced scab to 2 per cent. Other similar comparisons could be made between the moderate application of weak and strong lime-sulphur or weak and strong Bordeaux.

Foliage Injury and Russeting of the Fruit.—The relations of strength of material, rate of application and the amount of active ingredients to russeting on the fruit are all very definite. This is true with both Bordeaux and lime-sulphur. Injury to the fruit has been divided into three arbitrary groups which have been called light, medium and heavy russeting. Light russeting consisted of apples that were lightly netted or roughened, medium russeting included more extensive netting or completely russeted areas but not badly roughened. The heavy russeting included all apples more severely russeted than those classed as medium. By reference again to Table 1 it will be seen that with equal dosage weak lime-sulphur caused consistently less russeting than the strong lime-sulphur. For the light dosage there was 7 per cent. and 12 per cent. of light russet, for the medium dosage there was 12 per

cent. and 27 per cent. of light russet, and for the heavy application of weak there was 13 per cent. of light russet, but with the heavy dosage of strong lime-sulphur there was 28 per cent. of light russet, 10 per cent. of medium russet and 1 per cent. of heavy russet. When considered on the basis of rate of application it is found that an increase in dosage always caused more russeting. Likewise an increase in the amount of active ingredients invariably resulted in more russeting. With one unit of active ingredients there was 7 per cent., with both of the two-unit plots there was 12 per cent., the medium lime-sulphur with two and a half units also caused 12 per cent. of light russet, with three units there was 13 per cent., with four units there was 27 per cent. and with six units there was 28 per cent. of light, 10 per cent. medium, and 1 per cent. heavy russet.

A study of the results from Bordeaux yielded similar comparisons except that in every instance the amount of russeting was very much greater than with lime-sulphur.

The relation of the different factors to foliage injury from lime-sulphur was also very definite. Without going into a detailed discussion of results it may be stated that strong lime-sulphur caused more foliage injury than weak lime-sulphur, moderate dosages caused more than light applications, and heavy applications caused more than either the light or moderate applications. The range of injury was very wide—with the light application of weak there was very little leaf-fall, in fact little more than normal. The degree of injury increased with the various dosages and strengths until there was almost complete defoliation with the heavy dosage of strong lime-sulphur. It should be stated in connection with this so-called lime-sulphur injury that lead arsenate was used in all the summer applications and at the same relative concentration as the lime-sulphur, and it is probable that the injury was largely the result of the combination rather than from either one alone. It is probable also that this same condition holds with regard to russeting on the fruit.

On Bordeaux sprayed trees there was no indication that the strength of the material, the rate of application, or the amount of active ingredients bore any relation to the amount of foliage injury from Bordeaux. The season evidently was one unfavourable to Bordeaux foliage injury, and there was only one epidemic and that a rather light one. In some seasons Bordeaux injury to foliage is much heavier than shown here, but on the average is less severe than with lime-sulphur and lead arsenate, but the smaller amount of foliage injury is more than balanced by the excessive russeting on the fruit.

Spraying Management.—The title of this discussion indicates that something would be said about spraying management which is an important phase of orchard management, but up to this point little mention has been made directly on this subject. However, I think you will realize that the problem of obtaining scab and insect control without causing undue amounts of injury to fruit and foliage is a very serious problem in orchard management. Scab and insect control are of economic importance because they effect grade and consequently net returns; russeting of the fruit likewise affects the grade and price received for the fruit, and foliage injury is perhaps of even greater importance because it may have a direct influence on the production and bearing habits of the tree. We have seen that there is a wide range of control and injury according to the amount and strength of the material used. Is it not true then that the proper balancing of these factors may affect the total cost of the spraying operatious. Let us study the data presented with the idea of balancing scab control against cost and see what conclusions we come to.

Scab Control and Cost of Spraying.—Increase in dosage, as stated in an introductory paragraph, are of direct economic importance because they entail increased costs for material and labour and reduce the acreage that can be covered with a certain equipment, or make it necessary to increase the equipment in order to complete the operation in an equal length of time. The costs of materials, labour, and sprayer have been determined for these experiments, and together with results are presented in Table 2. The treatments are arranged according to the amount of scab. The cost of materials includes the lead arsenate as well as the fungicide. Lime-sulphur was figured at 16 cents per gallon, copper sulphate at 7 cents, quicklime at 1¾ cents, and lead arsenate powder at 16 cents per pound. The dosage used in these calculations is an average of those for the weak and strong concentrations of each material. The labour item includes two men and team at $1.00 per hour. The amount applied was 200 gallons per hour including the time for refilling and driving to and from the orchard. The labour cost per gallon, then, was ½ cent.

The cost of the sprayer includes gasoline, oil, grease, repairs and a deterioration charge of the outfit. The cost of the sprayer was $600.00. Seven years is assumed as the length of time it will be used, operating a total of about 2,000 hours (a little more than 30 nine-hour days per year) and delivering 200 gallons per hour. Repairs are figured at $20.00 per year. These items give a total of $4.61 per day or ¼ cent per gallon as the cost of the sprayer, including maintenance and operation. Such costs will vary from year to year, and according to the size of the trees, the method of application and proximity of water supply, but the figures used here are reasonable for this particular work, but are undoubtedly much lower than for average conditions.

The data presented in Table 2 show some significant details as, for example, those presented by the different dosage of weak and strong lime-sulphur. An increase in the amount of actual fungicidal material always results in a decrease in the amount of scab, but an increase in the cost of treatment was not always necessary to obtain the better control. The moderate application of weak lime-sulphur gave 14.1 per cent. less scab than the light application of the same strength and at an increase of 14.4 cents per tree for the season. The light application of strong resulted in a further reduction of 1.2 per cent. below the moderate application of weak, but instead of an increase in cost, this better control was actually obtained for nine cents per tree less than the previous treatment. The next step, a heavy dosage of weak material, shows another reduction in scab of 2.6 per cent. but at an increased cost of 23.4 cents per tree. The succeeding treatment reduced scab 2.1 per cent. and at a cost lower by 3.6 cents per tree. Why were some increases in control obtained at an increase in cost and others actually lower cost? From the light application to the moderate of the weak there was a doubling in cost of all items because the strength was constant, but the rate of application was doubled. Similarly with a moderate application of weak to a light application of strong, the cost of material was the same for both but the labour and sprayer costs for the latter were just one-half because of the difference in dosage between the light application of strong and the heavy of weak there is a moderate increase in the cost of material, but the labour and sprayer costs are tripled because one is a light and the other a heavy application. The fourth step, from a heavy application of weak to a moderate of strong, shows an increase in cost of material, but a total cost actually less because of lower labour and sprayer charges. The same statements may be applied with small exceptions to the Bordeaux treatments.

TABLE 2.—SCAB CONTROL AND THE COST OF TREATMENT

Material	Rate of application	Comparative amounts of		Scabby fruit, per cent.	Spraying cost per tree for the season (cents)				Reduction of scab, per cent.*	Increase in cost of treatment, cents
		Dilute material	Active ingredients		Material	Labour	Sprayer	Total		
Weak lime-sulphur	Light	1	1	23.0	5.4	6.0	3.0	14.4	....	....
Weak lime-sulphur	Moderate	2	2	8.9	10.8	12.0	6.0	28.8	14.1	1.44
Strong line-sulphur	Light	1	2	7.7	10.8	6.0	3.0	19.8	1.2	—9.0
Weak lime-sulphur	*Heavy*	3	3	5.1	16.2	18.0	9.0	43.2	2.6	23.4
Strong lime-sulphur	Moderate	2	4	3.0	21.6	12.0	6.0	39.6	2.1	—3.6
Strong lime-sulphur	Heavy	3	6	2.0	32.4	18.0	9.0	59.4	1.0	19.8
Medium lime-sulphur	Regular	1.5	2.5	2.2	12.2	9.0	4.5	25.7	....	....
Weak Bordeaux	*Light*	1	1	19.9	3.4	5.0	2.5	10.9	....	....
Weak Bordeaux	Moderate	2	2	4.6	6.9	10.1	5.0	21.0	14.3	10.1
Strong Bordeaux	Light	1	3	2.4	10.4	5.0	2.5	17.9	2.2	—3.1
Weak Bordeaux	Heavy	3	3	1.0	10.4	15.1	7.5	33.0	1.4	15.1
Strong Bordeaux	Moderate	2	6	0.3	20.9	10.1	5.0	36.0	0.7	3.0
Strong Bordeaux	Heavy	3	9	0.6	31.4	15.1	7.5	54.0	0.4	21.0

*The treatment under which the greatest amount of scab developed *is taken as a base for figuring the reductions.* The treatments are arranged in the order of the amount of scab found, beginning with the greatest and the reduction is determined for each item by subtracting its per cent. of scab from the next greatest amount.

It is evident, then, that the cost of spraying for the control of scab cannot be lowered by increasing concentrations as this would involve increases in labour and sprayer costs because of the necessarily heavier application. On the other hand, increased concentration and smaller dosage would usually be unsafe because of the danger of incomplete coverage and the consequent poor control. In what way, then, are spraying costs to be lowered? The development and use of cheaper materials is a possible but rather improbable step. The only obvious way of accomplishing this end is through more effective spraying and improvement in spray management in general. This would involve many factors but probably the most important are, the use of sprayers of a capacity that will require the least outlay for men and teams consistent with satisfactory results, the maintenance of the spraying equipment in a highly efficient condition, a plentiful and convenient water supply so that the sprayer can be used in actual spraying operations for the maximum proportion of the time, and a rapid method of measuring and mixing concentrated materials when refilling the sprayer.

Summary.—I am afraid that this discussion has been rather rambling, and that perhaps I have not made clear all the points that seem to me to be important, and in order to bring out these points I will summarize the statements of results. This may be best accomplished by stating and answering several direct questions.

1. Will weaker lime-sulphur or weaker Bordeaux control scab? With equal applications, the strong material may always be counted on to give better control. The grower who sprays heavily may safely consider reducing the strength of his fungicidal sprays, but the man who sprays lightly or unsystematically certainly should not use weak sprays.

2. Will weak sprays cause less russeting of the fruit and injury to the leaves? Yes, but only with considerable danger of poor scab control.

3. Can we spray too heavily? Yes, we can spray too heavily. If the material is strong enough we gain nothing in scab control after the dosage has reached a certain optimum point and may lose heavily in foliage injury and finish of the fruit.

4. Should we use a small amount of strong material, a reasonable amount of medium strength material, or a large amount of weak material? Best results should be obtained from a thorough but not excessive application of medium strength material.

5. From the point of view of economical application what is the best combination of strength and dosage? On the basis that the actual amount of active ingredients applied determines results, we would say that a light dosage of strong material is most economical, but since coverage and concentration are both involved it would be unsafe to depend on the light application because of the danger of incomplete coverage. The safe method, then, seems to be to take the middle course and use a moderate application of medium strength material.

There are one or two points further that I wish to emphasize. First, this question of weak, medium and strong materials is entirely a relative matter and what I call a medium strength material might, in some other district, be called a strong material, or on the other hand some might consider it weak. I can see no reason, however, why the general results discussed here would not hold with any necessary range of concentrations. With regard to reducing the strength of the material, I will add that I feel it would be practical to use considerably lower concentrations for the summer applications when scab is not so

critical and when foliage injury is most likely to develop. Another possible combination is to use the regular strength lime-sulphur for the pre-pink and petal fall applications and then to substitute a less active sulphur spray such as dry-mix or wettable sulphur for the later sprays when foliage injury and russeting of the fruit are likely to be most severe.

The second point I want to make clear is this. I have not come here with any idea of making definite recommendations as to what you should use here under your conditions. It would be very unwise for me to advise you to use lime-sulphur or Bordeaux, or increase or decrease the strength of the material you are using. There is one place to which you should go for such information and that is to your own Experiment Station. I do feel, however, that the things I have been discussing may have a general application to your problems and may be of value to you.

TORONTO MARKET FOR ONTARIO FRUITS

W. J. McCart, Toronto

When I was asked to attend the convention I hardly knew why my name had been selected to address a gathering of growers. However, I accepted, having in mind that the invitation carried with it a desire on behalf of the growers that the growers and wholesalers should meet more often in the future than perhaps they had done in the past. I would just like to say that the growers' problem nearly at all times is the problem which confronts the wholesale man as well. I would also like to impress upon this meeting that the wholesale dealers in Toronto are always interested in hearing from the grower. Perhaps it would sound foolish on my part to say that we were always willing to hear complaints. However, I have no hesitation in saying this: that if you have complaints we are ready to listen to them and see if we can meet together on common ground.

The subject which has been allotted to me is, "Toronto Market for Ontario Fruits." That is rather a large subject and there is a very great difference of opinion about the Toronto market. With no offence to anyone I have no doubt there are many people in Ontario, many growers, perhaps, not assembled here this afternoon, who have in mind some new and different method by which they could operate the Toronto market. I expect there are many wholesale commission men, perhaps, in Ontario and in Canada who think they could tell you people how to operate your farm so that you might make a profit, and a profit which I think each and every one of you are entitled to. However, some people think that Toronto Market is the poorest in Canada. Others think and believe it to be the best in Canada. The fact remains that Toronto operates at the present time the largest wholesale commission fruit market in Canada. When I say that, I mean that there are more fruits and vegetables sold in Toronto on consignment than any other market in our Dominion, and if we make comparisons with some of the commission markets on the other side of the line we find that Toronto does not suffer, either for the quantity of produce sold or for the facilities which we offer for transacting our daily business.

I would not be so foolish as to stand before a gathering such as this and try to make you believe that the wholesale fruit men are satisfied with the conditions under which they are operating at the present time. It is a well-known fact to each and all of you gentlemen who have visited the Toronto

Market during the summer months that we are very greatly handicapped for room. We have not the proper facilities for the transacting of our business, and not only myself but all other wholesale dealers in Toronto are very much in favour of securing larger and better premises. During the past six months our Association, which is known as the Toronto Wholesale Fruit Jobbers, has had very many meetings with a certain individual who was to erect a new fruit market. Up until a few weeks ago we were sure that this market would have been built, but when we got our estimate of the cost these were altogether out of all line with our expectation. For instance, my own business, which perhaps would require as large a space as any of the others, would cost me $10,000 a year rental. That cost could not be borne by any wholesale fruit merchant in the City of Toronto. We have not lost hope of a new market in the next year or two. I am not prepared to say where and when that market should be erected, but our committee has a new idea, and if our present plans bear fruit we shall soon have a market which will be pleasing to the commission men and, perhaps, to the growers.

Most people come to the conclusion that all of the Ontario fruits come to the Toronto Wholesale Fruit Market. Now, that is not a fact. Toronto receives only a very small proportion of the fruits grown in the Province of Ontario. You have in this province your canning and jam factories, you have in the city of Hamilton a market where considerable fruits and vegetables are sold. You ship many cars to Montreal and other points in the Province of Quebec. You load many cars for Winnipeg and Western Canada, and last, but not least, a great quantity of your fruits and vegetables are sold to private dealers who go into your district with their trucks and take these loads away from day to day.

Someone has said that the other markets in Ontario receive better quality of fruit than does the City of Toronto. I am not prepared to admit that is true for I know in my own business we receive some of the best varieties and the finest quality of fruits that are sold in the Province of Ontario. Yet I have no hesitation in standing here this afternoon and saying that a great quantity of the fruits which come to the Toronto Market should never be shipped to any commission market and should have been kept at home. I know no more effective way of killing the Toronto market or any other market than by shipping fruit of inferior quality that the grocer would not use on his own table. Have you ever considered that the cost of shipping a basket of poor fruit is exactly the same as shipping a basket of good fruit? It requires the same time in picking and in packing, the cost of your baskets is exactly the same, and the transportation charges are also the same. No commission man or no salesman will put forth his best efforts to get a good price for poor fruit. That is one of the hardest things that any salesman or commission man has to sell.

Some few years ago, as you know, nearly all fruit and vegetables were shipped to Toronto either by rail or by boat. Since the advent of the automobile this has all been changed; large quantities of fruit and vegetables are now delivered by motor truck. A few years ago it was absolutely necessary for all retailers in Toronto to come down to what we call the Wholesale Fruit Market; it was absolutely necessary for them to purchase their supplies on that market. To-day Toronto market, the same as with other markets in Canada and the United States, is undergoing a change owing greatly to the advent of the motor truck. There are to-day large supplies of fruit brought to the wholesale market by motor truck. But there are also large quantities of fruit and vegetables brought daily to the outside markets, markets both outside and inside of Toronto. When I say market, I refer more particularly to markets where the retail dealer

can go and buy his supplies. Another large quantity of fruit is sold by the individual grower and is peddled from day to day. Therefore, the retailer does not have to come down to the Toronto Wholesale Market as in the past.

Another system has apparently become very popular. Nearly all retailers, not only in Toronto but in other cities, own their own motor cars or trucks. These retailers find it profitable, otherwise they would not do so, to go out into the country each morning during the summer months and buy their supplies, buy large quantities of fruit and vegetables, which naturally do not come near the Wholesale Fruit Market. The point I want to make is this: All these conditions I have mentioned naturally hurt the wholesale commission man and the wholesale fruit market as a commission market, and it is not in the interest of the growers that all these conditions shonld be allowed to exist. At the same time I know of no reason why it should not be. You quite understand, as well as I do, that a grower living close by the city, if he has an opportunity to sell his goods to someone who comes to his door he naturally is going to do it. At the same time it takes away from the wholesale commission market in Toronto a large number of buyers that otherwise would come to the market.

Another system of marketing has sprung up which also disposes of considerable quantities of fruit and vegetables; I refer to the markets along every highway in our province and particularly close to our cities. I have in mind several owners of such private markets who come to the wholesale fruit market and purchase their supplies. Naturally, the city dweller who drives out in the country in the evening on a holiday imagines he is buying fruit and vegetables grown by that particular market dealer. In many cases that is true, but in many other cases it is not true because they sell only what they purchase from us or from the farms. You can readily understand then that these people can hardly be expected to buy or sell as cheaply as if they were buying in the wholesale market.

We have been in the custom of making contracts every season for the purchase of several cars of grapes; with what results? With the result that on 90 per cent. of our purchases, at least, we lost money. Now, what has brought that about? Largely the motor truck again. At the present time there are several people in Toronto and other cities who operate motor trucks during the summer months that go over in the Niagara Peninsula. They buy their grapes at the same price at which we purchase a car load, and in some cases for very much less, and in nearly every instance those same people are able to come to Toronto and undersell us who purchase these grapes by car load. You can readily understand that we have discontinued the purchase of grapes in car lots except at the tail end of the season perhaps when they become somewhat scarce or the other fellow is about through. I am just mentioning these facts to show you the conditions under which we are operating at the present time not only in Toronto but in other places as well, owing to the advent of the motor truck. The motor truck, so to speak, has transformed the wholesale fruit business in Toronto, or in other words the truck has brought the farm almost to the city dweller's home.

I quite remember when I was a young boy attending what I think they called the Farmers' Institute meetings. These meetings at that time in the section in which I lived were attended largely by dairy farmers. The point always made by the speakers was to weed out their poor stock, and if I remember right they called the poor dairy cow a boarder. You gentlemen have very many poor varieties of fruit trees which do not pay you and take up the room of good trees; therefore, I would say, "weed out your boarders," or weed out your poor

trees. We are told in the press that we to-day cannot purchase a good Ontario apple in the fruit stores here. Why is this so? It is not the fault of the retail dealer, nor of the wholesale dealer or commission man. Naturally any man in business, be he retailer or wholesaler, will try to give the public what they demand, and that is a better dessert apple than the average Ontario apple shipped into Toronto. Please do not misunderstand me; I do not mean to say that we do not grow the variety of apple in Ontario that is asked for, but what I do say is this: that by good grading, by an honest pack, and by an attractive package, the British Columbia apple grower has captured the trade of the fancy fruit stores of Ontario. That is a fact that cannot be contradicted. I am sure we are all glad that the money is going back into the pockets of the Canadian grower at least; but I do not see any reason whatever why the Ontario apple grower should allow the British Columbia grower to capture the market in Ontario or any other market in this particular. If you would grow McIntosh and Spy and other varieties that I might mention, then you would hold your own in the home market.

I have one or two other suggestions that I would like to make. Be careful of grading and standardization of packages. Co-operate more with the wholesale commission man; ship fruit of good quality only; use an attractive package. At the Eastern Canada Jobbers convention held a few weeks ago in the city of Toronto I spoke on "An Attractive Package," and pointed out that probably no man in the wholesale fruit business feels more keenly and strongly on the question of an attractive package than I do. Such a package combined with good grading will do more to put your fruit on the markets of Ontario and other markets than anything else you can do. Someone might say the retailer doesn't eat the package. That is quite true; the retailer or consumer when he buys a bunch of beets or carrots doesn't eat the tops but he does buy it because the tops are green and look attractive. It is all a question of appearance. You people must remember that in all the fruit and vegetables that are grown, it is not a question of variety, but it is largely a question of a good package and a good pack. Some one has said that 90 per cent. is purchased through the eye, and I believe it is so.

Another point which might be almost too much to ask, that you have confidence in your commission man. The commission man sometimes is known as a bad fellow, but I want you to bear in mind at all times that most commission men have your interest at heart. Any commission man, if he is going to prosper and build up his own business which means holding your business, must be honest whether he wants to be or not. I would also like to say that you should not too readily believe what you are told about your commission man. Sometimes much of this discussion that we hear is based on what is supposed to be the case rather than what are the facts.

Another point is that low prices are very often the result of over-production of a crop and these prices at times bring a good deal of worry to the grower. As a commission man, nothing makes me feel more keenly for the grower than to see, at times, the prices at which his goods are sold; but we cannot control the prices of the Wholesale Fruit Market of Toronto, that is largely made up of supply and demand.

Another matter which I like to refer to is the apparent large profit which is made by the retailer not only in Toronto but also throughout Canada. Now, I do not attend here this afternoon holding any brief for the retailers, but I do not know of any single retailer in Toronto who is becoming rich, but I do know that a great many retailers have to struggle to make a living. Perhaps

it is true there are too many retailers in the fruit business in the city of Toronto and elsewhere, but admitting that fact, who is going to say to you and to me that we cannot go into the retail business if we desire to do so? It is a survival of the fittest.

In connection with retail sales, Prof. Rasmussen, of Cornell University, has prepared extensive tables showing the number of sales required to sell one package. From every case of head lettuce, which contains four dozen, there were 39 retail sales; from every case of peaches of 65 pounds, there were 28 retail sales; from every hamper or bag of sweet potatoes, 65 pounds, there were 24 sales; box of apples, 40 pounds, 18 sales; cabbage, 95 pounds, 31 sales; canteloupes, 96 pounds, 30 sales; from every bag of onions containing 100 pounds there were 43 sales; from every bag of potatoes, containing 225 pounds, there were 33 sales. If there is an average of some 30 or 35 sales from every single package sold by the wholesaler, you can readily understand why retail prices are high; figure the time and money required for selling, the paper, the twine and so forth. We know from experience that every retailer would rather sell a large package than to make a small sale, yet to-day the public demand purchase of goods in small parcels.

There is not a single man in this building this afternoon who can go into the retail business and hire or engage help and make a profit out of that store. That might be a broad statement, but it is one that I am satisfied is correct. A great number of retail fruit stores in the city of Toronto and other cities are operated by Italians. These people seem to be especially adapted to operating a retail fruit store. I would certainly term them good business men and first-class buyers; they are industrious, they work long hours and they pay strict attention to their own business. These Italians have a store in front and mostly they live in the rear. The owner comes down to the market daily, and sometimes twice a day, and he knows at home his wife and his family are looking strictly after his business. These stores remain open from seven o'clock in the morning until eleven or twelve o'clock at night, and if I know my own race I am satisfied that they are not prepared to put in that many hours in order to make a living. That is why the Italian is making a success of the retail fruit business.

REPORT OF THE RESOLUTIONS COMMITTEE

H. T. FOSTER, Burlington, Chairman

Your standing committee on resolutions beg leave to present the following report for your consideration:

1. Resolved by the members in convention assembled that we desire to express to the Ontario Department of Agriculture our appreciation for the work done in directing the spray service in the leading fruit sections of Ontario last year, and are glad to know that this service will be available for the season 1927.—Carried.

2. Resolved that the members of the various associations should prepare and submit their resolutions for the Horticultural Council at least two weeks previous to the annual meeting of said council to permit of proper presentation.—Carried.

3. Resolved that the thanks of this convention be tendered to the press of the Province, particularly the Hamilton and Toronto dailies.—Carried.

4. Resolved that we, the Fruit Growers of the Province, hereby wish to express our appreciation of the work being done at the Vineland Experimental Station in all its branches, and we believe the results obtained justify all the expenditure; also our appreciation of the services rendered by officials of the Dominion Branch of Agriculture.—Carried.

5. Resolved that the Federal Department of Agriculture be requested to bring before the notice of the public and the retail fruit trade the new grade regulations as they affect open packages, referring especially to the fact that purchasers of fruit not bearing a grade mark have themselves to blame if they receive culls at first quality price.

Mr. Onslow: I think that is too stringent altogether. The great majority of men around St. Catharines put their packages up in leno. The law says they do not have to grade that package. They are sold on the commission market on inspection. I think that resolution is far too stringent altogether.

The Chairman: This resolution simply draws attention to the situation at the present time. This resolution is not asking for any regulation.

Mr. Onslow: No, I think it is casting a reflection on the man that puts his stuff in leno-covered baskets and I don't like it.

Mr. Roberston: Under the law, a package can be sold with the grade marked and according to law the fruit in it has to be according to the grade. It does not prohibit the Niagara leno-covered baskets which are not marked. When it is marked they will get first-class fruit, and it is the publicity to be given to it. That is the reason of this motion.

Mr. Onslow: I maintain the resolution makes an inference that one is liable to get cull fruit and pay a high price. I don't see any reason why an open package should have cull stuff in it; it has just as good stuff in it as the closed package.

The Chairman: The statement that an inference may be cast upon the open package in this resolution, I don't think can be justified. I would most emphatically state that people do get in open packages stuff that is not up to expectation.

A Member: I would like to say that we have a staff of inspectors that are going around the country, and I want to say to you there is better stuff shipped in open packages than in closed packages, and we are prepared to open our package and prepared to at any time stand by our fruit, and we don't like it to be said that we are shipping culled stuff.

The Chairman: I think perhaps the discussion is running off to something that is not included in the resolution. I think Mr. Sheppard will admit there are some open packages, the contents of which are not satisfactory. We are not saying about all open packages but the attention of the public is drawn to the fact that ungraded fruit must be bought on its own merits and no guarantee attached. There is certainly nothing to which Mr. Sheppard should take objection.—Carried.

5. Resolved that we, the Fruit Growers, wish to express our appreciation of the work of Mr. Lewis Duncan in his report on the alleged combine in the distribution of fruits and vegetables produced in Ontario, and we heartily agree with the findings and that we urge that the Attorney-General of this province

meet with a committee of our growers with a view to taking immediate action on the recommendations of the report and such other recommendations as may seem advisable to us.

After considerable discussion, and on the suggestion of Mr. McCart, the proposed committee would include representatives of the commission houses. Motion then carried.

MR. FOSTER: This is a communication from the fruit growers of Quebec. The meeting of the officers and directors on December 21st last considered the question of changing the dates of National Apple Week to a later date in November. It is felt that the present date is too early to help the sale of apples especially for winter use as people are buying heavily for immediate consumption at that time. Now, the suggestion of the Resolutions Committee is this:

That we approve of this resolution and suggest that the date coincide with the date of the Royal Winter Fair.—Carried.

MR. FOSTER: No. 8 is a communication from the Eastern Canada Fruit and Vegetable Jobbers' Association:

Resolved that this Association make every effort through the carriers to secure the establishment of Carriers' Protective Service to points in the territory east of Port Arthur. The recommendation of the Resolutions Committee is to adopt the resolution but have the matter of rates decided by the Transporation Committee in conjunction with Major Wheeler.—Motion carried.

MR. FOSTER: No. 9. Resolved that the size requirements of Tolman Sweet apples under The Fruit Act be changed from 2½ to 2¼ for No. 1 and 2⅛ for No. 2.

THE CHAIRMAN: I understand this resolution was forwarded by the Georgian Bay Association and means a reduction of a quarter of an inch in No. 1 and an eighth of a inch in No. 2.—Carried.

MR. FOSTER: No. 10. Resolved that it is in the interest of the fruit growers of Ontario that the report of the Canadian Horticultural Council be printed and distributed, so that the efforts of the Association be better understood and a close contact and use of the Central Association be made by the fruit grower.—Carried.

11. Whereas the radio is one of the most important instruments of education to-day and is being used extensively in other countries by the Departments of Agriculture.

Be it therefore resolved that we, the fruit growers of Ontario, here now in session, do petition our Provincial Department of Agriculture to establish a "Farm Radio Service" in the immediate future, and that a copy of this resolution be forwarded to the Honourable J. S. Martin, Minister of Agriculture, Parliament Buildings, Toronto.—Carried.

12. Resolved that, as there is yearly a number of questions requiring legislation placed before the association, that the scope of the work of the Tariff Committee be enlarged to include all such questions and that the committee be hereafter known as the committee on legislation.—Carried.

13. Resolved that in view of the extensive planting which is likely to take place in the near future, it is very important, in the interests of the fruit industry, that the fruit growers of the Province of Ontario should have, as soon as possible, reliable information in regard to the many new varieties of fruits which have been and are being originated by fruit breeders and available from other sources

some of which are much advertised. That in order to obtain this information the Provincial Government be asked to re-establish experimental orchards and fruit testing stations which were at one time of great value to the fruit growers, but which have for some time been discontinued; That at least twenty-five such fruit testing stations be established and be situated with a view to embracing all important climatic conditions in those parts of the Province where fruits are grown commercially, and that the situation of these stations be left to a committee appointed by the directors of the Ontario Fruit Growers' Association.

THE CHAIRMAN: This resolution was brought in by the Committee on New Fruits. We have, as chairman of that committee, Mr. Macoun of Ottawa, and I would like Mr. Macoun to speak on this resolution, if he would.

MR. MACOUN: *The older members will remember that some years ago the Provincial Government had some twenty-five fruit testing stations scattered over the Province and gradually they were cut out, and it was felt that in recent years so many new varieties were being originated that it is very important the growers of Ontario should have the information as to these varieties. The suggestion made in the resolution is that stations be re-established and the various new fruits that are offered for sale should be tested at these stations and the information given out as promptly as possible to the fruit growers in order to save them money and in order to place the fruit growing industry on the best possible foundation. The expense is merely a nominal one; it involves paying a man for testing these new fruits on an acre or two of the land on his farm.*

FALL SPRAYING OF PEACH TREES

E. F. PALMER, Vineland Station

I just wish to state a little more fully what I said yesterday following Mr. Dutton's address concerning the effect of fall spraying on peach trees. Perhaps I should say first of all that Mr. Dutton while he did not have absolute evidence to support it, yet felt that fall spraying peach trees with lime-sulphur was a practice to be regarded with suspicion, and we have felt at Vineland the same way for two or three years. This last fall at Mr. Ross' suggestion we conducted an experiment on a six-acre block of Elbertas. In that block we fall sprayed certain rows and left others unsprayed, the idea being these would be sprayed this coming spring. This is a seven year old block of Elbertas all in good vigour and soil in good till. Now, the results, as I mentioned yesterday, are simply these: About ten days after the frost of January 26th we made counts of the peach buds alive and dead and we found that the unsprayed trees carried 65 per cent. of live buds and 35 per cent. of dead buds. Whereas the lime-sulphur fall sprayed trees carried 98 per cent. of dead buds and 2 per cent. of live buds. This is for the one variety of Elberta and it is simply one season's obervation. It is quite possible that another year conditions might be quite different; however, the essential fact remains that you can get this result in some seasons and what has happened once is likely to happen again. Not only were the buds practically all killed following the fall spraying, but if you could see the wood on the fall sprayed trees you would see a tremendous difference in the condition of that wood and the condition of the unsprayed trees. On the unsprayed

trees the wood is in good condition as well as the buds being two-thirds of them alive; in the fall sprayed trees not only are the buds dead but the wood is in bad condition and apparently has suffered severely from winter injury. Now, exactly why this is I am not prepared to say. We do know, of course, that spraying has some effect which breaks the rest period in the wood of the peach and probably breaks the rest period in other trees as well; particularly in the peach it breaks it and in the case of the peach the breaking of that rest period is likely to result in very drastic winter injury.

While we are not perhaps exactly prepared to make definite recommendations as to fall spraying, yet the evidence which we have suggests that you as growers should be extremely careful how you practice fall spraying of peach trees.

Q.—What time of the year was that fall spraying done? A.—It was about the beginning of November, after the first week in November. It was good weather, it was not freezing, all conditions, as far as we know, suitable for fall spraying.

ROUND TABLE CONFERENCE ON SPRAYING

DR. G. H. BERKELEY: On account of the lateness of the hour we are going to ask Mr. Ross to start this round table discussion with a few minutes talk on the Oriental Peach Moth. He is down here for a talk on Spray Materials; he is not going to talk on that subject at all, but we will leave that for Prof. Caesar to include with the spraying operations.

THE ORIENTAL PEACH MOTH—W. A. ROSS, Vineland Station

An intensive study on the life history, habits and control of the Oriental Peach Moth is being conducted by the Dominion Entomological Branch, and every effort is being made to discover a satisfactory method of controlling the insect. You will all be interested more or less in the distribution of the insect. It is rather generally distributed through the Niagara Peninsula and also occurs in Essex County. An orchard near St. Davids appears to be the centre of what we are terming the St. Davids' infestation. This orchard has apparently been infested for several years and from here the moth has, in all probability, spread by flight and carried by winds. West of St. Davids there has been little spread, at least we were unable to find any traces of the insect a few miles west of St. Davids. What apparently are isolated infestations occur at the following points: In the vicinity of St. Catharines, where the moth is apparently largely confined to that area which is triangular in shape, the angle is formed by St. Catharines, Port Dalhousie and Port Weller; the moth occurs at Peachland; at Vineland Station, where at least three farms have been infested; at Grimsby, where at least eight farms are known to be infested; at Bartonville; at Fonthill; and at Olinda in Essex County.

During the past week or so I have frequently been asked this question by growers: "In view of the seriousness of the Oriental Peach Moth would you advise us to continue to plant peaches?" That is the sort of question I never like anybody to ask; however, my answer has been somewhat as follows: Keep cool, have a little faith in entomologists, if you are at all religious pray for the entomologists, and in the meantime go ahead with your planting programme. On our part we will continue to follow the control programme until we have

found some method of preventing the ravages of the insect. I don't think it is necessary to say anything more about the Oriental Peach Moth. If there are any questions I will endeavour to answer them.

Q.—Does it spread rapidly? A.—The natural rate, I cannot give you any definite information, but we do know the moths will fly at least half a mile.

Q.—Will it spread away from the peaches at all? A.—The Oriental Peach Moth attacks all our fruit trees but my opinion at the present time is this: It is going to be primarily a pest of the peach trees and a very serious one at that. It is going to be a problem, in all probability, in apple and pear orchards adjoining peach orchards or in the vicinity of peach orchards but I don't think it will be of any importance where peaches are not grown particularly.

Q.—Where is the egg laid? A.—On the bloom.

Q.—Where does it winter? A.—The caterpillar winters on the soil, on the trunk, and on the main limbs of the trees.

Q.—What do they look like? A.—The caterpillars at first are whitish in colour; later on becoming pinkish and when fully grown they are half an inch long.

Q.—Hairy or smooth? A.—Smooth, more or less; very much like the codling moth.

Q.—What injury does it do? A.—The caterpillar injures the peach in two ways; first of all by boring into the cups of the tiny twigs and in this way destroying the twigs. On badly infested trees it is a very easy matter to detect these wilted twigs, but the most serious type of injury is caused by the insects eating their way to the centre of the fruit and feeding on the pulp. Infested fruit may show external signs of injury in the form of worm holes with gum and saw-dust-like material exuding from the holes. On the other hand the infested fruit may show no signs of injury, in which case the caterpillars have entered the fruit through the stem. Last year in examining infested Elberta peaches we found that 30 per cent. of the infested fruit showed no external signs of injury That is rather a serious matter because it means that the fruit grower, no matter how careful he is, cannot possibly cull out all the infested fruit because in the case of these fruits not showing any external injury, the only way you could find out if the fruit is infested would be by cutting the fruit open and then you find the caterpillar inside.

Q.—What method do you suggest that the growers should follow under present conditions? A.—At the present time the only recommendations we are making to the growers are to thoroughly cultivate one to three weeks before blossoming; thorough cultivation at that time will destroy all, or practically all, the caterpillars which hibernate in the soil and we are asking the grower to destroy every cull by feeding them to pigs or covering them over with some cheap oil; putting them in piles and sprinkling some sort of cheap oil on them. These two methods are for the purpose of keeping the infestation down to a small number. In badly infested orchards thorough cultivation is never going to prevent severe injury. At the present time we don't know how to prevent severe injury.

Q.—Spraying has not very much effect? A.—No, not very much.

Q.—Will lime-sulphur, spring-sprayed, kill them? A.—No, no effect.

Q.—Could you tell us something about the Cotton Moth? A.—The Cotton Moth is a grayish brown moth, with a wing expanse of about inch and a third; they migrated from the Southern States and came into Southern Ontario in immense numbers last season. It was particularly abundant in the Niagara district where by penetrating and feeding on the peach it caused a considerable

amount of worry amongst the fruit growers. Not only that but it gave rise to some alarming newspaper stories. Many fruit growers mistook it for the Oriental Peach Moth; one of the local papers carried a story to the effect that this moth had created untold havoc overnight in the Niagara peach orchards. It had not. The Cotton Moth, as its name indicates, is a pest of the cotton, and it cannot survive the winter anywhere north of the gulf states. You need not lose any sleep over the Cotton Moth. Last fall was the only time in my experience, and I have been here since 1911, in the district, that the moth actually caused any noticeable injury in peach orchards.

Q.—You have seen it before? A.—Oh, yes, we have frequently collected it but I have never found the thing attacking peaches anywhere.

Q.—I would like to ask you whether you are going to make any changes in the time of spraying our pear trees for pear psylla?

A.—No, I want to have all that spraying done before any eggs are laid by the over-wintering flies. Apply the spray as soon as all, or most, of the flies have emerged and before the egg-laying is done. You may be interested to learn that experiments we conducted last winter, or the winter of 1925, demonstrated that next to killing the over-wintering flies the most important action of the oil spray is residual action, it prevents egg-laying. We found that the over-wintering flies of the Pear Psylla would lay but few eggs on oil-coated wood, practically none at all.

Q.—It does not kill the eggs? A.—No, it has very little, if any, effect as an egg spray. For that reason I want to have all the spraying done before the eggs are laid. If you want any information on oil sprays you can get it from Mr. Fisher. Last year Mr. Fisher sprayed everything on the farm with oil except his barn.

Spray Materials and Spraying Operations—Prof. L. Caesar, O.A.C., Guelph

I have the feeling that after listening to Mr. Dutton's very interesting paper that he gave us, a good many men here are pretty badly confused in their mind as to what they should do in regard to spraying.

The first thing that I shall refer to is this: You heard a good deal of criticism of the lime-sulphur spray and Bordeaux spray and also of the dust. Now, the natural thing is if they are all bad or all have very bad characteristics, what are you going to do? Well, this is true: that we have not got an ideal spray. Lime-sulphur is not an ideal spray; we have known that for years and years. We have also known what Mr. Dutton said about the taking off of fruit under some circumstances. We have known that in some conditions it will take off fruit and we know that it will injure foliage under some conditions.

Q.—Might I ask if you add lime, does that stop the burning, to any extent? A.—No, I have not seen any difference, that it lessens the burning of fruit.

Q.—It was leaves that I have reference to? A.—No, I don't know of that either. If you apply four sprays of Bordeaux mixture and the season happens to be somewhat late you will lose practically one-quarter of your foliage. I know that four heavy sprays of Bordeaux, that is, extra heavy, will result in the loss of nearly half of your foliage. That is on apples; and it will also take off cherry foliage to some extent. You have had your attention called to the fact that Bordeaux does lessen the size of the cherry. It is an excellent spray for controlling leaf spot but it lessens the size of the fruit. You have to stick to lime-sulphur or wettable sulphur or dust so far as that is concerned. One spray of Bordeaux I have never found any injury to the leaves, I have never seen two

sprays do any harm, but three sprays and four sprays have. Bordeaux mixture for apples russets the fruit in a dry season. You should not use Bordeaux for the pre-pink spray as a rule, certainly not for the calyx spray, that is the regular spray after the blossoms fall. For that you should possibly use some of the sulphur sprays. Where there is no San José or Oyster Shell Scale, or anything of that nature, you should not use a dormant spray at all but you should use a spray after the buds are clearly burst, when you see the little leaflets opening out. It is a very much delayed dormant spray and then you should use Bordeaux mixture. Why is it that of all the times that you can burn the foliage with lime-sulphur, that is one time when you can burn the leaves the worst? If your trees happen to go into the winter in a weakened condition, if the winter itself has been severe upon the trees, as certain winters have been, and then the next spring if you have the buds burst and then there comes wet weather and they stand for a long time without making any growth, you get a delicate condition of these leaves and lime-sulphur applied then would destroy a great quantity of those open buds and leaflets. It is interesting to know that the healthier your tree is, the more vigorous your buds, the less fear you have of burning with lime-sulphur, and it was just to tide you over that period and give your leaves a chance to be more vigorous that I suggest Bordeaux there.

Now, for the other sprays I suggest you apply lime-sulphur. There is nothing like experience to answer questions and there is no question in the world you can injure your trees very much by heavy spraying of lime-sulphur. Some men in their efforts to make a good job put on too much spray. I know one man who last year when he sprayed his orchard with one of these new powerful machines, and in his efforts to get a perfectly clean fruit, put so much lime sulphur on that it so wilted his leaves he injured his fruit; he also sun-scorched many of his apples. Spray your trees well enough to cover every leaf and every fruit and the men who are doing that are getting annual crops.

There is also another point; for example Michigan is more inclined to have russeting than Ontario, so that you don't need to be troubled over the russeting damage of lime-sulphur. The ideal spray, of course, we have not got yet. The ideal spray would be one that you could apply as heavily as you liked without causing very much injury, that will control your fungus or your insects and that will stick on the foliage. That is the sort of spray I hope we will get very soon. In Michigan they use more sprays than we do. I never recommend more than five sprays and hardly ever more than four, that is, as a maximum, unless it be some special. Again, in New York State they use far more sprays than we do. We recommend in our spray service just four sprays and we don't feel so badly hurt if some people only put on three, if it is a district where apple scab is scarce or where there is not much trouble from the Codling Moth. The least number of sprays the less likely you are to injure your fruit and as the spraying season goes on some men try to put on less spray until the final one, that is the one after the Codling Moth spray; that, of course, is to tide you over serious injury from scab. In one of the worst seasons we have had these four sprays worked out remarkably well. I would like to impress upon you that each spray must be thorough, each spray must keep your fruit clean. After you have your tree covered once go on to the other; the second spray must control it until the third, and the third until the danger period for the development of scab is usually over, and also the insects.

Q.—What about the side worm; I noticed last year we were instructed about scab but we were not especially instructed as to the side worm? A.—The side worm is due to late springs, I mean springs where your fruit develops slowly

when the season is cold; that is when you get your great side worm injury. The only spraying you can give to kill the side worm is this: Put on the spray in the late seasons about the 1st of July, that is about four weeks, almost four weeks, after you finish your Codling Moth spray. That is the only thing we can recommend at the present time.

There is one thing that I ought to call your attention to. If you look at apples that are scabby you will find that the scabs are on the one side and not on all sides. If you go into a scabby orchard when the apples are ripe you will find in nearly every case you go right to the trunk and look out, that these fruits look pretty clean, and if you go to the outside and look in, they look bad. That just shows the necessity of thorough spraying. You would not expect that the apples would have the scab on the outside, which is always the sunny side. You know that the inner part of the apple is the part where the moisture remains longest; you know moisture is the condition which gives conditions favourable to scab and surely scab should develop on that side. The explanation is this: When the apple was small it was standing up, but when that apple became larger it began pointing outward and the scab therefore would show up on the outside, but it is clear evidence that it must have started on the inside. Now, surely that is worth repeating: that in the ordinary tree the scab, 75 per cent. of the scab, develops on the inside of those little fruits and it will show on the outside when it gets older; what inference are we to draw from that? Simply this, that the part of the apple that we must cover is the part we are most likely to miss, because it is the part of the apple that is furthest away from us and is pointing in to the inside of the tree. If the tree is pruned properly the better you can spray. If there is a wind stand back and let the wind carry the spray through the tree. Mr. Dutton called your attention to the necessity of having everything ready for your work, not to lose any time, and the supply tank is a good thing. Mr. Hamilton only takes four minutes in filling his spray tank from a large supply tank, whereas the average man would take half an hour.

Q.—Is lime-sulphur of much effect in killing aphids? A.—Lime-sulphur does not kill aphids except to a limited extent.

MR. ROSS: We found oil sprays very promising as a means of controlling black cherry aphis. That is the aphis that attacks the sweet cherry, but at the present time we are not prepared to recommend oil sprays for controlling apple aphis. Unfortunately, or fortunately, in our work the rosy apple aphids have not been of much account and our unsprayed fruit has been practically as free from injury as the sprayed fruit. Sometimes you find the green apple aphis in large numbers on young trees. Personally I would advise you, where you have that condition, to spray them next year with nicotine sulphate at the time of the delayed dormant. But those trees may become re-infested later on by the winged aphids flying in from other trees. In such cases, the only thing you can do is to spray again with nicotine sulphate.

PROF. CAESAR: Let me emphasize that point. These young trees which have just come out of the nursery during the first three of four years may often become seriously injured by aphids. If you see these insects there, it is worth your while spraying the trees at the time stated by Mr. Ross. If there is nothing on the trees there is no use your spraying.

The question was asked what about the liquid blower. We tried it out last year at the College and near Simcoe; I liked it fairly well myself but others don't like it. I understand they have been improved this year with a new engine and some other small improvements. It is exceedingly easy to work; throwing a

powerful spray and if there is no wind you can send it pretty well the length of this room but it has not any great penetrating force. You put your hand in front of it and it does not hurt, but if you put your hand in front of a spray gun with a powerful engine back of it you soon take it away. I noticed it was harder to get it through the foliage than with the ordinary spray gun, but I think it has good possibilities and would like to work it out another year to see.

Q.—What about the July spray—? A.—I don't like to spray in July.

Q.—For side worm? A.—About the 1st of July, if it is a season where there has been a late spring and you are getting worried about it, you can put on a reasonably light application.

A MEMBER: I would like to ask Mr. Ross about spraying raspberries. We sprayed our raspberries and burnt the foliage.

MR. ROSS: We have been forced to the conclusion that you cannot use sulphur in any form on raspberries because under certain conditions sulphur is likely to cause injury.

Q.—With dry mix? A.—Yes; there was undoubtedly sulphur injury last year; we get injury from sulphur in all forms.

Q.—What are you recommending? A.—We are not recommending anything; we are trying some other spray mixtures. The raspberry, I am sorry to say, is extremely susceptible to spray injury and we are not going to make any recommendations regarding the red spider until we get hold of something that will be safe to use on raspberries under all conditions.

Q.—If Bordeaux has a contracting effect on size in cherries has it not the same effect on other fruits? A.—We don't know.

Q.—No experiments have been made? A.—No, no experimental evidence at all in regard to that.

APPENDIX

INTRODUCTORY NOTE—At a conference of fruit growers and shippers called by the Hon. John S. Martin, Minister of Agriculture for Ontario, in August of 1926, those present decided to appoint a representative in Great Britain to look after their interests. Mr. W. B. Somerset of Burlington while in England the year previous on private business had made some enquiry into shipments of his own fruit, and had become so convinced of the desirability of direct representation that he volunteered at the conference to undertake the work without salary for the shipping season of 1926-27. This generous offer was accepted by the growers and on the suggestion of Hon. Mr. Martin, the Fruit Growers' Association of Ontario assumed the responsibility of directing shipments and financing the undertaking.

REPRESENTATION FOR ONTARIO FRUIT GROWERS IN ENGLAND

W. B. SOMERSET, Burlington

The writer was authorized last fall by the Fruit Growers' Association of Ontario to act as their English representative in an experiment along the lines recommended by Mr. J. Forsyth Smith, the Canadian Fruit Trade Commissioner in Great Britain.

Mr. Smith gave it as his matured opinion that the appointment of a fruit growers and shippers' representative in England during the selling season would not only save the growers large sums in selling expenses but also result in very much better returns through intelligent marketing and taking advantage of constantly changing conditions, holding back in times of glut and trans-shipping to other markets.

For the purpose of the experiment it was expected that twenty-five thousand barrels of fruit would be sent over during the season. On this basis a charge of five cents per barrel was established to cover expenses. As it worked out, this arrangement would have more than provided for all expenses involved, if the requisite amount of fruit had been forthcoming. Owing to crop and other conditions, however, instead of receiving one hundred carloads of fruit as expected, considerably less was sent forward, which, while quite ample for experimental purposes, failed to provide sufficient income.

EFFORT JUSTIFIED, RESULTS AND COST

That the effort was entirely justified and that arrangements should be made for representation every year, seems to the writer to be fully demonstrated. The cost of the services of a representative, including a salary, travelling expenses to Great Britain and maintenance while there, should be covered by the experimental charge adopted last season, provided the facilities are properly taken advantage of. It is felt that there should be no difficulty in this when shippers realize the advantages and increased cash returns obtainable. The difficulty will be in restricting the shipments available to only that class and quality of fruit that will do the Province credit.

Careful record of each sale was kept and Mr. Forsyth Smith asked to make an independent analysis of each transaction. Better returns were realized from each sale compared with similar fruit sold on the same markets at the same

time. In addition to this, comparisons showed that selling costs were also reduced, showing additional profit. Nor did the advantages end there, for the comparative results do not take account of the gain made in trans-shipping fruit to other markets, nor the results of holding back fruit from sale during periods of temporary glut.

The writer did not attempt, during last season, to combat or correct any outstanding abuses or unfair trade customs. He had not sufficient tonnage behind him to make any such effort effective, and it was felt that sufficient would be gained for the first season by ascertaining what such abuses were and bending every effort to get the best possible prices, and secure for all shipments the minimum standard terms both as to commissions and handling charges for spot sales.

A great deal was accomplished by co-operating with the brokers and other channels of trade and by holding back or trans-shipping where it seemed wise. Through being on the ground and having fruit to dispose of, your representative was able to gather a great deal of valuable and definite knowledge as to handling costs, commissions and different sales methods.

Relations with Brokers

It was freely foretold that this effort would antagonize the British brokers and do harm rather than good. This was found to be entirely incorrect. All trade channels were found to welcome the effort and to offer hearty co-operation. Brokers almost universally took the attitude that they would welcome new conditions that would concentrate fruit shipments in a representative's hands; that they would be in a position to give better service if they could confer with a properly authorized man on the ground as to alternative courses to follow and to whom all conditions could be made clear, removing causes of misunderstanding.

The brokers and trade generally deprecated the present unorganized conditions which make it seem necessary for them to extend expensive efforts to secure shipments from this side, all of which they say quite frankly the shipper must expect to be done at his expense. Their contention that present conditions give rise to instability and loss to shippers, through the multiplicity of agents and sale efforts and the encouragement of irresponsible and fly-by-night brokers, seems borne out by facts. A bad season, for instance, is often followed by a good one the next year. In a bad year good brokers and sales agents, however conscientious and painstaking, get no credit if results are disappointing. Dissatisfaction gives opportunity to the irresponsible broker. Shippers' proper profits are discounted and exploited without the shipper realizing it. Fruit is bought outright, and the shipper satisfied with prices that are often much short of what could be obtained by holding true to the old established man. Shippers should understand that outright purchases are almost always at prices to their disadvantage. Their own representative on the ground could protect them against this and give correct information on conditions.

Market Conditions

Market conditions with regard to different varieties of apples were all upset last season. Supplies from the United States were enormous. The comparative failure of the British crop was offset by the reduced demand owing to the coal strike, affecting not only the coal mining district, but all other portions of [illegible] in other trades was multiplied and buying power

reduced. London, supposedly never a good market for large, green or cooking apples, offered high prices and large consumption for these varieties owing to the British apple crop failure. Your representative cabled several times for this variety of apple to be shipped to London, and if any quantity of shipments had been made, good prices would have been realized, where the same varieties were meeting poor sales in the usually good markets.

Retail Prices

The low prices at which apples were sold at primary sale, were not passed on to the consumer. The retail fruit trade in Great Britain holds out for unreasonably high profits ranging from one hundred to three hundred per cent. Through this policy they hold down the prices they pay to the producers and reduce the consuming demand, which should automatically increase and take care of large supplies on import. It is unreasonable that the retailer should be in a position to exact from one to three times as much as the grower receives for growing, pruning, spraying, packing and shipping, added to what the transportation companies get and the brokers and wholesale trade. The retailer, all authorities agree, should consider thirty-five to fifty per cent. profit ample to cover everything, including wastage. His exorbitant prices result in a vicious circle of unfair prices to the consumer and starvation returns to the grower. Fruit sold at a fair profit by the retailer in England would have the paradoxical effect of lower prices to the consumer and higher prices to the grower and shipper through stimulated consumption.

The investigations of the Empire Marketing Board, which is the organization established as a result of the report of the Imperial Economic Committee, should lead to redress in this matter. Not only are they conducting a large advertising campaign to create a preference on the part of the consumer for Empire fruit, but they are also spending large sums in scientific research work to determine the cause of wastage and loss to shippers on fruit arriving in England and a thorough investigation into marketing conditions. In the writer's opinion, if the Empire Marketing Board used a portion of their advertising space to advertise regular lists of fair retail prices for different apple varieties, such effort would increase the sale of Empire fruit to the advantage of the purchasing public as well as the Empire fruit growers. Full credit, however, should be given to the solid features of the Board's advertising, urging health reasons for larger fruit consumption.

Ontario's Reputation Excellent

Ontario apples have an excellent reputation in Great Britain. As they have always been labelled "Canadian Apples" the average Britisher often regards them as the only apple from Canada. Nova Scotia and British Columbia apples are in another class, and in all markets Canadian apples (i.e., Ontario) bring preferred prices. Some few large shippers from Ontario do a great deal to injure the reputation of our fruit. In the writer's opinion the facts (easily ascertained by a man on the ground) should be acted upon by the authorities to prevent this general injury to our reputation and trade.

Empire Marketing Board

It is recommended that hearty co-operation be offered to the Empire Marketing Board in their investigations and scientific research into the causes

of wastage and fruit arriving in bad condition with resulting loss to shippers. This same investigation covers the question of "slacks" and the wide variation in customs and rules of the different markets as to "slacks." It was pointed out to the writer by the officials of the Board that while they could do a great deal of work along this line, they felt their work would be inconclusive unless they could follow up the fruit further back, tracing each shipment from the orchard in which it is packed. It would seem that in the case of all Government inspected shipments at least, this could be done, and on the point of Government inspected cars for export, I cannot urge too strongly the advantages of having this done. The Government inspection certificate attached to a bill of lading was found to pay for itself several times over in the better prices realized through the confidence it created in the minds of the buyers.

It is to be regretted, by the way, that Canada is not represented on the "Fruit Committee" of the Empire Marketing Board, although Australia, New Zealand and South Africa have members on it. It is felt that the Canadian Fruit Trade Commissioner, who had so much to do with the Imperial Economic Committee, out of which grew the Empire Marketing Board itself, should be on this Committee to present Canada's problems and requirements.

Corrugated Liners

It seems certain that corrugated liners to barrels, top and bottom, would improve the appearance and value of our apples. Apples from the United States use these almost universally, and repeatedly, at auction and other sales, brokers and salesmen pointed out to your representative how these pads prevented bruising and slackness. I believe the adoption of corrugated liners would be found profitable.

Continental Markets

There seems to be large possibilities for your representative in supplying Continental markets. While it is practically impossible to ship apples to advantage direct to Sweden, Norway, Denmark, Holland, Germany and France, very good opportunities frequently arise to trans-ship apples from England to these countries at advantageous prices. Market prices in these countries are subject to wide and rapid variations which must be taken advantage of when they occur. A very considerable re-export trade to these countries from Great Britain is now carried on by a section of British brokers and buyers, and there seems no reason why these profits now going to British buyers should not accrue to shippers. No risk attaches to such trans-shipping as selection, delivery and condition can be assured. Beyond investigating its possibilities, your representative did not attempt trans-shipping to the Continent last season. It would require very careful investigation in those countries themselves and careful ground work preparation. At one time the writer thought he had arranged a sale of two carloads of apples to France, but the fruit did not arrive in good condition and the sale had to be cancelled. At another time, a reshipment to Hamburg seemed advantageous but it was discovered that as Canada had not yet made a trade treaty with Germany, we are not entitled to the most favoured nations clause and the tariff nullified an advantage of nearly $1.25 per barrel. The United States and Great Britain have trade treaties with Germany, and U.S. apples were being sold there from England to considerable advantage

London as a Market

In the past, London has not seemed as favourable a market for Ontario fruit as Liverpool and Glasgow, although it has been found very favourable to Nova Scotia shippers. Such investigations as your representative made, convinced him that some of the disadvantages that have made Ontario shippers shun London, can be overcome, such as wide difference in selling and handling costs. There are some varieties of apples which sell there to considerable advantage, Ben Davis for instance in February and March. Also this variety can be re-exported to Continental markets in some of which it finds favour.

Marketing Methods

In the main, there are two marketing methods open for Ontario fruit in Great Britain, and the writer believes that a fuller knowledge of the advantages and shortcomings of each may prove of value. Sales may be made through:

1. Auction sale brokers.
2. Private treaty brokers.

While opposed in their methods, in your representative's opinion, both classes of broker serve very useful purposes.

Auction Brokers

Auction sale brokers always provide an outlet through which fruit can be sold quickly and at all times. On a rising market they usually secure better prices for the shipper, but the opportunities afforded for attention to an individual shipper's consignments are limited. Auction sale brokers usually sell all fruit immediately it is landed—on the first sale day, and there are three sale days a week. They merely inspect fruit on the docks or at the sales room and upon purchase remove the fruit from the docks. Immense quantities of fruit are put through the auction room each sale day and there is no time for individual salesmanship, although brokers sometimes do withdraw offerings if they feel that the prices offered are disastrous, but a lot held back is always under some suspicion for future sales. Theoretically and practically auction sale brokers should be able to sell fruit at less cost to the shipper. Actually his rate of remuneration is practically the same as private treaty brokers where more actual sales work and expense is involved.

Private Treaty Brokers

Private treaty brokers sell to wholesalers or retailers through private sales. Normally they transport the shipments from the docks to their warehouses and hold them there until sold to their satisfaction. Their commission charges and the actual out-of-pocket expenses for dock and town dues and cartage into warehouse usually amount to about the same as the auction sale brokers. Handling charges in the case of the auction broker seem to amount to an additional commission of about 5 per cent. While prices obtained by the private treaty brokers are regulated to some extent by the prices set by the auction sales, for superior quality fruit, private treaty brokers can and do get better prices and in cases of temporary gluts, or falling prices, the private treaty broker holds back and stores without charge, often saving a shipper a heavy loss.

Charges

While there are no fixed scale of charges to shippers by auction sale brokers, and individual shippers have been charged commissions ranging from as high as 7½ per cent. with handling charges to as high as 2s 3d per barrel, there does seem to be a general agreement among them that auction sale brokers' charges shall not be less than 3 per cent. commission and handling charges of 1s 5d per barrel, this applying to Liverpool, and minimum terms being for "spot sales" so called, which means fruit placed in their hands on the ground, not shipped from abroad or subject to agents' commissions or charges. In London the minimum terms of auction brokers seem to be 2 per cent. commission and 2s 0d per barrel handling charges. While the auction broker's commissions are popularly supposed to be his entire remuneration and this commission now paid by Ontario shippers ranges from 5 per cent. to 7½ per cent., it should be realized that this is not the case, and that auction brokers expect a profit of from 7d to 10d per barrel over and above their commission and cost of handling which brings the total remuneration on average prices from 10 per cent. to 12 per cent. and on minimum spot sales terms about 8 per cent.

Private treaty brokers handle shipments on all short terms, some charging a lower commission and making a profit on handling charges, and others dealing on a straight commission basis, with handling charges at actual out-of-pocket cost. Outside of a few firms who adopt handling charges at cost as a fixed principle, one usually finds that these brokers are willing to handle shipments on any basis a shipper prefers, but as the commission comes down, the handling charges go up and vice versa. Generally speaking, however, the private treaty broker would seem to prefer a remunerative commission arrangement with handling charges at cost, but too few shippers can grasp this confused system of concealed profits sufficiently to determine the patent advantages of a real open and above board arrangement. What these brokers ask is for a non-profit handling charge basis from 6 per cent. to 10 per cent., but there is no charge for any storage if necessary to hold the fruit over.

The Consolidated Charge

The system of the "Consolidated Handling Charge" so called, seems to have originated during the war. Instead of increasing commissions, brokers changed the system of charging for dock dues, town dues, cartage, etc., at out-of-pocket cost, to "Our charge" for these items, which included a profit, and commissions were let stand as they were. In one sense brokers were thus taking a concealed commission. How much profit there was in the "Consolidated Charge" was hard to know, and few, if any, shippers were informed or realized that the broker got remuneration out of anything but his commission.

Thus the broker came to charge pretty well what he liked for his services without the shipper knowing it. To increase the consolidated charge was also a very easy device by which to pay agents or other parties influencing business, and I have been told by brokers that exactions of a penny or two a package by agent, sub-agents or some one else supposed to be influencing shipments had become a scandal, when piled one on the other. One shipper sent the writer an account sales slip from a prominent auction sale Liverpool broker showing a commission charge of 7½ per cent. and a handling charge of 27d per barrel. Contrasted with the established minimum of 3 per cent. commission and 17d handling charge, the broker seems to have done very well. The selling cost to the shipper in this case was over $70 more than the standard minimum terms

obtained by your representative. In this particular case the shipper had sent to the broker direct without the intervention of an agent, removing any excuse that such a charge was legitimate in any way.

Handling Charges Should be at Cost

While the writer is the last person to feel that brokers should not be paid and paid well for good service, he does feel that a handling charge involving a profit is indefensible. If the commissions charged by brokers are not sufficient, and perhaps 2 per cent. or 3 per cent. is too low, these commissions should be increased to an adequate amount, but the handling charges should be only actual out-of-pocket costs. Under the present system, the shipper, besides being put to the disadvantage of not knowing what the broker charges for his services, is also in the position that the broker is making the bulk of his revenue from a source uninfluenced by the price obtained, and can be comparatively indifferent if price received for the shipment is unsatisfactory to the shipper. If the broker makes enough profit per package on the handling charge to give him the equivalent of 5 per cent. on the sale *whether he gets good prices or not,* he is not in the same boat with the shipper at all as far as his interests are concerned. That is, it is not equally important to broker as to the shipper that good prices be obtained because *his sole remuneration is not his commission.* The broker does not share the shipper's loss in times of bad prices.

In your representative's opinion this situation will not be difficult to correct once the shipper understands that a higher commission with handling charges at cost is a better arrangement than a low commission with unspecified handling charges. There are many good brokers who would welcome a frank and above board basis of dealing, just as there are others who take the ground that they would rather waive all commissions entirely than give up the profit on handling charges.

Representation Necessary for Better Prices

While the problem of reducing selling costs is important and with sufficient volume of tonnage behind him, your representative should have no great difficulty in accomplishing a great deal of this. The most important thing in the writer's opinion is the matter of securing higher prices. There seems to be no room for doubt that Ontario shippers have lost many hundreds of thousands of dollars through lack of orderly and intelligent marketing and not having someone on the ground to protect their interests. It was observed last season that there were several periods when fruit was not coming forward, when it could have been sold to advantage, and while brokers will seldom admit that they can be overloaded with shipments, there were other times when brokers sold at a sacrifice to move what they had against heavy shipments on the way when other brokers and channels of trade were lacking supplies. With the bulk of their remuneration coming out of their handling charge, it is easy to understand how brokers do not often tranship to other markets and brokers are too often prone to become merchants instead of brokers where there is an advantage to be gained in buying on the spot and selling elsewhere. Your representative was able to trace a great deal of buying on the London account in Liverpool and back and forwards between different cities. None of this was done on the shippers' account and sometimes often primary sale fruit would pass through two or three hands before reaching the actual selling trade, and the difference between the

prices at which it had been sold at auction, for instance, and when finally disposed of was quite remarkable. Prominent brokers denied that reputable firms ever bought and sold fruit. It was against the rules of their association. It was illegal and dishonest to be both broker and merchant. Nevertheless practically all these brokers buy fruit abroad on their own account and a great many sell back and forwards to each other and sometimes to themselves under thinly disguised names. The ethics of these transactions may be arguable, but the fact remains that a shipper's representative on the ground can prevent such transactions and secure the extra money for the shipper to whom it should belong. One other small matter discovered was that remittances in dollar exchange instead of Sterling, as is the custom, resulted often in an advantage to the shipper of more than the whole cost of the representative's service.

The writer would be very sorry if it should be taken that serious reflection or criticism is cast on brokers and the fruit trade generally. He is convinced that the established channels of trade are the best means of marketing, and hearty co-operation with the best elements and willingness to pay well for good service is the only sound policy. In the whole business world each fact, whether it be production, transportation, distribution or marketing, considers its interests as of paramount importance. In the practical working out of affairs the other fellow's point of view has to be considered and a balance that is fair all round arrived at. As far as the fruit growers of Ontario are concerned, it is not to be wondered at, if they remain unorganized and unrepresented where their interests are of most vital importance, that they fail to get their proper share of the results.

Co-operative Marketing a Privilege Not an Obligation

The writer has had the pleasure of reading reports to their respective organizations, by Mr. E. J. Chambers, President of the Associated Growers of British Columbia and Mr. Eric Leslie, Secretary of the Nova Scotia Fruit Growers' Association. Both gentlemen were in England last season, and although in each case their problems are somewhat different to those of Ontario, I am in substantial agreement with what they say. Both of them agree in considering maintenance of a representative in Great Britain during the selling season essential. In the case of British Columbia, this is in spite of the fact that all their fruit is marketed through one firm of brokers who are in a sense their English representatives. In the case of Nova Scotia, Mr. Leslie takes the ground that entire tonnage of Nova Scotia must be subject to supervision in Great Britain. British Columbia, I believe, is also moving towards compulsory co-operation in export. While I am in agreement that complete co-operation in marketing is desirable, I cannot feel that compulsory organization is the way to its accomplishment. If co-operative marketing through a representative in Great Britain cannot demonstrate itself a success and prove itself desirable on its merits, it seems to me it has no right to exist. It must be demonstrated to be profitable and advantageous, and it should be offered as a privilege to fruit growers and shippers who will live up to certain standards of production and packing, and all others should be denied participation. Further, I believe to render such service of the greatest possible value to all growers and shippers both large and small, that some provision for cash advances against Government inspected shipments should be made.

Market for Plums in Great Britain

A very interesting and important experiment in the way of shipping plums to the British market was undertaken last season. Some of these shipments arriving before your representative's arrival and not subject to his intervention seemed to indicate that Great Britain was no market for this branch of Ontario's soft fruits. The writer's study of the situation and handling of subsequent shipments demonstrated, to his satisfaction at least, that England will absorb all of Ontario's plums, especially late ones, that can be shipped over and at profitable prices. The first shipment was made to the wrong market and was picked too green and badly handled at some stage of its journey. Subsequent shipments were transferred to another market and did extraordinarily well in spite of the arrival condition of some of them not being what they should be. All Ontario plums properly picked, handled and shipped to arrive in England after the first week in October, will have a ready sale. By that time the British plum crop has been disposed of and the field is practically bare of competition. There is no reason why Ontario plums should not arrive in the English market in perfect condition. South Africa ships enormous quantities of plums to England every year in their season. The fruit must carry a six weeks' journey. Canada can land its fruit in two weeks. The mistakes of last season were picking the fruit too green, improper refrigeration temperatures, and the breaking of refrigeration in Montreal. Some one must be in England to attend to the marketing of this fruit as a new feature of the market. Fancy shipments of large plums in single layer or double layer crates would pay handsomely.

The writer is not satisfied that previous export of peaches were made under conditions to lead to the conclusion that Ontario peaches cannot be profitably exported to England. He believes from investigation made that the former experimental shipments failed because the fruit was too green, not refrigerated at proper temperatures. They arrived in a poor and tasteless condition. Your representative saw two eleven quart baskets of Niagara peaches bought at random in Montreal, almost in ripe condition, taken to England in the ship's refrigerator, and perfect table fruit a week later in England.

It is recommended that a special conference of intending plum shippers should be arranged so that all conditions in regard to successful shipping should be realized. Heavy losses will result if shipments are made carelessly, whereas good prices should be realized if proper shipping conditions are observed. Information as to successful handling of plums by South Africa is available. It is also recommended that special arrangements be made with the steamship companies for space and the proper handling of this fruit to which they are not accustomed. More favourable rates comparable with the rates for other fruit should be negotiated. As far as possible, the marketing of plums should be centralized and organized to distribute the shipments over the season and avoid competition and overloading of certain sales outlets. The market can absorb all the plums that we can send, but care must be taken in handling the distribution and marketing.

Ontario Department of Agriculture

TWENTY-FIRST ANNUAL REPORT

OF THE

Horticultural Societies

FOR THE YEAR

1926

PRINTED BY ORDER OF

HON. J. S. MARTIN, MINISTER OF AGRICULTURE

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

ONTARIO HORTICULTURAL ASSCCIATION

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TREASURER'S REPORT

RECEIPTS

Balance on hand as per statement of February 6th, 1926		$1,520 13
Sale of banquet tickets		267 00
Legislative grant		500 00
Bank interest to 30th November, 1926		43 72
Affiliation fees to date, 1926 and arrears	$616 32	
1927	281 02	
		897 34
Total receipts		$3,228 19

DISBURSEMENTS

King Edward Hotel, account banquet	$436 50
Convention expenses: clerical assistance, $48; music, $15; badges, $43.52; half cost trunk for papers, $3.63	110 15
Honorarium to Secretary, $100; to Treasurer, $25	125 00
Perth Print, letter heads and envelopes	34 75
Canadian Horticultural Council, affiliation fee, 1926	100 00
Dunlops Limited, flowers	20 00
Lecture expenses: G. W. Tebbs, $61.66; Wm. Hartry, $24.45	86 11
Juvenile work, R. R. Graham, expenses	12 00
Prize money, Cheese Factory Competition: G. E. Wheatley, Campbellford factory, $25; C. H. Harrison, Burgessville factory, $25	50 00
Perth Print, printing 1927 banquet tickets	3 50
Peninsula Press, 1,000 affiliation fee cards	8 50
Treasurer's account, postage and war tax	8 05
Bank charges on cheques	11 65
Total disbursements	$1,006 21
Balance	2,221 98
Total	$3,228 19

C. A. HESSON,
Treasurer.

ONTARIO HORTICULTURAL ASSOCIATION

The Twenty-First Annual Convention was held at the King Edward Hotel, Toronto, February 10th and 11th, 1927.

PRESIDENT'S ADDRESS

F. A. KENT, Port Perry

I am keenly disappointed in not being able to be present at this 21st Annual Convention and tender my sincere regrets. From my official position, there appears to me to be some tendencies or policies that I would like to bring to your attention, believing that the future welfare of the Association would be strengthened by your thoughtful consideration of same. I believe the placing before you of certain questions is even more important than to summarize growth and development. I feel sure our worthy and esteemed superintendent, Mr. Wilson, will give details covering the progress that is being attained in our work. While our membership has been rapidly increasing down through the years, this should not reasonably be a subject for congratulations, unless growth carries with it the proper functioning of the various units of our Association. Each new society has to depend mainly on the knowledge and enthusiasm of flower lovers who become members and do all in their power to further its interests but may be handicapped when problems they have not been accustomed to, arise.

Recently the Hon. John S. Martin realized the growing need of a permanent lecturer in Horticulture and appointed H. J. Moore to this position on Mr. Wilson's staff. The work of the new appointee has been invaluable to the societies throughout the Province, he being an enthusiastic flower lover as well as a fine lecturer and never tiring worker.

I would suggest that a draughtsman be added to the Horticultural staff; such official would prove useful in drafting plans for lines of work that are being carried on by our societies, such as local town beautification. In adding to the headquarter's staff you would receive service of a very practical nature, that in due time your societies will rather take an allotment of five or six cents per member from your funds to be used in helping to maintain such a service in preference to using a like amount in providing options, which are yearly becoming more and more doubtful as to being directly beneficial, especially in the older societies. Some societies last year did away with options replacing same with special service of various kinds.

In summing up our needs we look to the Ontario Government for reasonable assistance. Our grant of $20,000 per annum is altogether too small. What amount should we be entitled to on coming of age on this our 21st birthday? I suggest for your consideration, that whatever may be the means of financial assistance decided on by the Government, whether a definite increased yearly grant or a larger staff or both, from interviews with the Minister of Agriculture, I feel assured our reasonable needs will be taken care of. However, there is another question regarding commercialized Horticultural Societies that must be considered and dealt with by this Convention, before further Government financial help can be definitely counted on. The question of commercialized

Horticultural Societies has been a cause for considerable discussion and uneasiness for some years past. The principle entailed is decidedly wrong from each and every standpoint. When it is understood that a Horticultural Society receiving a grant from the Government or even grants of stock from large growers for presumably test garden purposes uses this for commercial purposes, this unfair competition against established business houses should not in the best interest of our Association be tolerated and measures should be taken to have it stopped. I would suggest that a resolution be passed covering this matter.

I would suggest for your consideration a closer and more friendly spirit of co-operation toward local and particularly Canadian business firms, remembering the slogan "Buy in Canada," which should be encouraged wherever possible. A closer co-operative spirit might be achieved by having what might be termed an advisory committee consisting of representatives from various trade organizations who could submit to your Association through your executive office suggestions for mutual and friendly co-operation. I understand the Convention will be given an opportunity to hear from a representative of the Trade when the question of advantages of Canadian grown products, together with definite plans for special rates to Horticultural Societies should be explained. Also a fair and candid explanation covering the various grades of what is known as Holland grown bulbs and shrubs, etc.

Your representatives to the Royal Winter Fair, viz.: Messrs. Godson and Whytock, have presented their report which will be read by the secretary. I wish to add an expression of sincere appreciation to those gentlemen for their work in connection with this particular show, as their efforts were of real importance in making it the great success it was, Mr. Godson being director in charge and Mr. Whytock chairman of the committee of the Floral end of the Royal Agricultural Winter Fair. I desire to thank the Toronto Horticultural Society for their kindness in again decorating the Convention Hall and the tables for our banquet.

I would draw attention to the importance of the exhibits being made at the Canadian National Exhibition. Ever increasing entries are being made by the members of Horticultural Societies. The Exhibition Management are endeavouring to make the Floral sections one of the big features of the show. Your individual and collective exhibits are necessary. Prize lists and all information may be had on request by applying to the Canadian National Exhibition, Lumsden Building, Toronto. The Floral Parade as presented last year on Floral Festival Day was a great success, althouth the day was marred to some extent by rain. The floats were of a decidedly higher quality as to design and workmanship than has been seen here before. Any assistance you can offer will be greatly appreciated. You can do a real service by sending cut flowers for general use in decorating cars and floats for this occasion.

Many questions have been asked regarding methods for running and maintaining interest in our Horticultural Societies. Often these questions come from officers of societies whose membership have apparently lost interest and are at a loss to know where to place the cause. Might I suggest possibly some causes together with suggestions for a better foundation to build on. A real cause for lack of a continuing interest in Horticultural Societies is undoubtedly caused by influencing new members to join, stressing the advantage to them personally on account of the large option value to be given rather than to explain and aim for a membership installed with the idea of service, primarily endeavour-

for general community beautification. Personally, I believe there should be a better understanding of the motives and objects of what a Horticultural Society should be, together with the nature of work that it should plan to accomplish. First eliminate the idea of offering unreasonably high value in options. Better to have a member feel his or her dollar is to be invested, so that they will receive reasonably personal dividends together with doing some good in their general community life. This idea should bring first to your members the thought of service, rather than how much are they to get out of it themselves. All the latter idea needs is a secretary who can draw in the dollars by offering a definite guarantee that the individual will receive two or more in return. Here you have a fine trading proposition but nothing to hold a real Horticultural Society together. Premiums or options supplied to members

Geo. L. Klosterman, President.

from income derived from membership fees and Government grants are well used when starting new societies where it is necessary to actually give the members something to plant and grow to start or create the love of flowers and gardens, but should not be overdone and should after at least three years be gradually used for purely educational and general town beautification, which, of course, should include reasonable amounts to cover at least one good local flower show. To increase this incentive in the membership some of the following aims might be used as suggestions from which your society could arrange their seasons policy.

Home and local town beautification begins in each case by a general policy of cleaning up unsightly and dirty vacant lots and old fences removed, as well as some newer ones. Many small cemeteries might be placed in at least

reasonably decent condition. Choose some public spot for improvement by planting shrubs, flowers, etc. By this it is possible to crystalize public sentiment from which the thought of beauty will come. Inspiring better citizenship, better love of home, making it a place to spend money with the thought that a house is not a real home without a garden. Happiness is the greatest asset a country can have. A proper spirit of competition in growing flowers should be encouraged by the holding of flower shows and garden competitions.

At each successive Convention constructive suggestions, many of them of practical value, are brought forward and endorsed but not acted upon. I would suggest that the incoming Board of Directors review the resolutions adopted at recent Conventions, select those which in their judgment might be made operative to the benefit of the Association, and take such steps as they deem proper to give effect to this proposal.

In reviewing the message I have endeavoured to place before you, I realize how difficult a matter it is to embody the topic chosen in a written message only, and I feel a genuine handicap owing to my inability to be with you and personally explain and assure you of my earnest belief that the questions dealt with are of major importance in the furthering of future development of the Ontario Horticultural Association and trust that they will be given your earnest consideration.

COMMITTEES APPOINTED

The following Committees were appointed:

Reception.—Lionel Godson and five members of Toronto Horticultural Society together with the Officers and Directors of this Association.

Resolutions.—Geo. Simpson, Ottawa, Convener; Rev. Geo. W. Tebbs, Dr. A. T. Morrow, Geo. Vickers, Barrie; W. T. Macoun, Ottawa; H. Occomore; Wm. Hartry.

Nominating.—F. C. Nunnick, Convener; Lionel Godson; Geo. Laithwaite, Goderich; J. E. Carter; Howard Hartry, London; C. H. Fuller, Windsor; C. A. Byam; W. P. Bailey; Fred Collins; Dr. Bradley Linscott, Brantford.

Questions Box.—H. J. Moore and A. H. Tomlinson.

Press and Publicity.—J. B. Spencer, Ottawa, Convener; J. Lockie Wilson, Geo. Simpson, Fred Collins, Lionel Godson, W. G. Sanderson, Toronto; A. B. Cutting, Lorne Park; Rand McNally, Toronto; H. J. Moore, Toronto; T. J. O'Rourke, Dr. Brethour, Toronto; J. E. Carter, F. C. Nunnick.

Committee to Meet Nurserymen.—Rev. G. W. Tebbs, Convener; T. J. Hannigan, Guelph; R. R. Graham, Guelph; J. Lockie Wilson.

REPORT OF SUPERINTENDENT

J. Lockie Wilson, Toronto

The members of the Horticultural Societies of Ontario have every reason to be proud of the rapid and healthy growth of their organization which has exceeded that of any similar institution anywhere in the world, and is being increased from year to year by thousands of citizens who have become imbued

with the idea of a more beautiful Ontario, and our membership is bending every effort to further the good work we have in hand. Each year many applications for organization of new societies are received from towns and villages where previously little had been attempted in the line of civic beauty. As stated in a previous year, the advancement is not confined to urban centres but extends to rural sections and townships, and there are no rural or urban communities but can be vastly improved through having a live Horticultural Society in their midst.

A new departure was taken last year which was inaugurated by the Farmers' Advocate for the inprovement in many sections of somewhat delapidated food-producing centres known as cheese factories, and the wonder is that Canadian cheese has stood so high in the markets of the world when one considers the buildings and surroundings in which this great Canadian industry is conducted. This forward movement has had the hearty endorsation and co-operation of our Association and your Board of Directors gave two substantial prizes, one for Eastern and one for Western Ontario for the factories that showed the greatest improvement in appearance of buildings and surroundings during 1926. I am of opinion that the cheesemakers who have done so well in the past will do even better work in the future, and the thousands of farmers who visit the factories daily during the summer season will catch the spirit of rural and home improvement that will go far to increase the beauty of our Province.

Our thanks are due to the members of the Toronto Horticultural Society for the beautiful and artistic decoration of our Convention Hall to-day.

In addition to the splendid exhibits of flowers at the Canadian National Exhibition and Royal Show there are three important events which are of interest to flower lovers held in Toronto each year, and the directors of these attractive exhibitions are deserving of support and patronage: The Gardeners' and Florists' Spring Show, the Toronto Horticultural Society's Summer Show held in Exhibition Park, and the beautiful Rose display staged by the Rose Society of Ontario in July.

There has been a good deal of misunderstanding and sometimes disappointment at rulings given by officers and judges as to those who were eligible to compete in the different classes at flower shows and I submit the following definition for amateurs, patrons and professionals for your consideration.

An *Amateur* is one who grows plants for the love of them and who does not gain any part of his livelihood from the sale of bulbs, plants, seeds, flowers, etc., and whose garden work is done without the aid of paid labour.

A *Patron* is one who grows plants for the love of them, and who does not gain any part of his livelihood from the sale of the products of his garden, and whose work is done wholly or in part by a trained gardener.

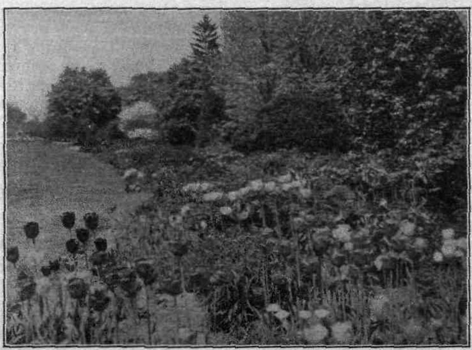
A *Professional* is one whose garden operations are conducted solely for commercial gain.

It has been suggested that in a garden competition the winner of a prize one year shall be debarred the following year from receiving the same or a lower prize in that class. A higher award, however, may be made. For example, a first prize winner in a class would be debarred the following year; a second prize winner could only be awarded a first prize. If his score entitled him to a second or third, he would not be eligible because the award was no higher than the year before. No prizes to be awarded in any class unless two or more entries are received, or unless the garden entered merits a prize. For previous years' first prize winners it would be advisable to have a special class. In cases

where prizes or trophies must be won two or three times before becoming the property of the winner this suggested regulation would not apply.

Mr. Moore, who has been attached to my staff as a lecturer on horticulture, has attended a large number of meetings and assisted in organizing a number of new societies. We have ten or twelve other lecturers and directors whose services have been available during the year and their assistance was much appreciated. 1926 has been on the whole an excellent year for Civic and Rural improvement in Ontario. Twenty-eight new societies were legally constituted during 1926. A number of others have made application for incorporation and will be added to our list during 1927.

It has been suggested that a committee be appointed to have supervision over the work of the societies. I do not agree with this proposition as it is a reflection on the Executive and Board of Directors appointed by this Association.



Darwin Tulips.

This Executive of yours is, I take it, the proper body to look after the interests of our Association. The majority of the Directors whom you have elected from time to time are enthusiastic horticulturists, willing to do everything in their power to further your interests.

Owing to the rapid increase in the organization of new societies and the consequent expanding membership, the grants to societies are becoming less each year. The $20,000 Legislative grant for your work is out of proportion to the amounts expended by our societies, as the following statement will show. These grants, as you are aware, are after the first year based one-third on membership and two-thirds on expenditure for horticultural purposes. Each new society formed is entitled to a maximum grant of $1.00 per member up to $75.00.

The total expenditure of the Horticultural Societies of Ontario during 1925 when the membership was nearing the 60,000 mark, was $150,841.84. Deducting the $20,000 Legislative grant there was an expenditure by the societies of $130,841.84. This large amount spent over and above the Government

appropriation was used by the patriotic members of our societies without hope of individual financial gain, and solely for the improvement in appearance of the homes and the Province we so dearly love.

I regret to have to report that a few of our societies failed to make their proper returns last year and consequently did not receive their Legislative grant. With my long experience in the Department as your superintendent, I am of the opinion that a forced growth of Horticultural Societies has not that permanence that we have maintained in the past, and I have found that the better plan is to leave the initiative largely in the hands of the citizens of the different localities themselves.

Under the Horticultural Societies' Act, one of the objects specified as coming within the scope of your work is the distribution among your members of seeds, plants, flowers, fruit trees, and shrubs. There has been objection raised to the giving of options to the members. I do not agree with this. Options mean that the society offering them gives a certain selection of plants, flowers, bulbs, etc., and they should be allowed to use their own judgment as to the manner in which this distribution is made, purchasing by wholesale their requirements and wherever possible, other things being equal, to encourage the purchase of our own Canadian products.

On your behalf I extend to the press our grateful thanks for the splendid reports they have always given to the proceedings of the Convention and the educational work of our 270 branches in the Province.

We have all read from earliest childhood of the floral beauty that surrounded not only the palaces of the kings but the humblest homes of the cottars of the Motherland, which were bowers of vines and roses, and it is a far cry from the printing of "The Gardener," a copy of which I have recently read, to the brilliant floral magazines that we delight to peruse to-day. This ancient journal that I refer to was printed at "The Three Daggers," Fleet Street, London, two hundred years ago. I know you will be interested in the advice given by the editor of this ancient volume, which is as true to-day as it was two centuries ago, and is as follows:

"And would men be ruled by me, I would advise them to spend their spare time in their gardens; either in digging, setting, weeding or the like, than which there is no better way in the world to preserve health. If a man want an appetite to his victuals the smell of the earth new turned up by digging by a spade will procure it, and if he be inclined to a consumption it will recover him. Gentlewomen, if the ground be not too wet, may do themselves much good by kneeling on a cushion and weeding. And thus both sexes might keep themselves from idleness and evil company, which sometimes prove the ruin of many people. But perhaps they may think it a disparagement to the condition they are in, truly none at all if it were but put in practice, for we see that those fashions which sometimes seem ridiculous, if once taken up by the gentry, cease to be so. And if you shall require a precedent, I shall present unto you that of the wise and mighty Emperor Dioclesian, who after he had reigned eighteen years, left for a season the whole government of the empire, and forsaking the court, betook himself to a mean house with garden adjoining, wherein with his own hands he both sowed, set and weeded the herbs of his garden; which kind of life so pleased him that he was hardly entreated to resume the government of the empire. By this time I hope you will think it no dishonour to follow the steps of our grandsire Adam who is pictured with a spade in his hand, to march through the quarters of your garden with a like instrument and there to rectify all the disorders thereof, to procure, as much as in you lies, the

recovery of the languishing art which did it but appear in lively colours, I am almost persuaded it would so affect you that you would be much taken with it. There is no better way to understand the benefit of it than by being acquainted with Herballs, and Herbarists, and by putting this gentle and ingenious exercise in practice, that so this part of knowledge as well as others may receive that esteem and advancement that is due to it, to the banishment of barbarism and ignorance."

You will agree that the words of this ancient gardener editor can be applied with equal force to the citizens of Canada to-day. Toil only gives the soul to shine and makes rest fragrant and benign.

The total value of the floricultural and decorative plant production by Canada during the year ended May 31st, 1926, is $1,582,463, comprising $34,492 for out-door roses, $86,182 for other out-door trees, etc., $146,581 for specific indoor plants, $12,005 for other indoor plants, $8,175 for flowering bulbs, and $1,295,028 for cut flowers. It is therefore apparent that the cut flower industry exceeds all the other categories together both in volume and value. The value of the cut flowers sold represents in fact 82 per cent. of the total.

In the absence of Mayor Foster, Alderman Carrick warmly welcomed the delegates to Toronto. He gracefully referred to the connection between flowers and prayer, expressing the thought that flower lovers' and growers' thoughts must inevitably turn to the Supreme Being.

W. P. Bailey: Mr. Kent has mentioned the grant which we get from the Ontario Government and that is one thing which deserves a lot of reconsideration by the Department. We have been operating for a long time on what has ended up by being a very small grant consequent upon the enormous expansion of this institution. We are due for special consideration at this time. Every Department of the governing body of Ontario is spending more money, spending it well and truly in the majority of places. I don't think there is a place in Ontario where a reasonable sum of money can be put to better use than in being voted for this Association.

I notice in one instance where there is a suggestion that we increase the paid operating staff of the Department. We could do with a draftsman, we could do with several other lecturers, but this Association has come through between twenty and twenty-five years of experience, obtaining a peak very quickly. Should we discard lightly the experience which has been gained in the last twenty or twenty-five years and which has been incorporated into the constitution of your societies? The Horticultural Act itself appears to be working well, and the general system which has operated so well that year after year we see 300 or 400 people coming to this hall and going back to their districts imbued with the idea that each town and village should be made oneof beauty.

Mr. Kent has made reference to the Royal Winter Fai r and the Canadian National Exhibition. I come from a section of the country which is not close enough to take in those functions, but it is to be hoped that the societies will continue to exhibit on those occasions and to patronize those institutions.

Mr. Wilson in his report takes an optimistic view of things. He has reason to have an optimistic view and to be proud of the things achieved. He and his staff have done wonders in that regard to the extent that no province in Canada holds the record that we do in Horticultural pursuits. He speaks in a kindly vein of the work of his subordinates and of the co-operation and the work of the directors in the Association in general. There is no trouble in getting co-operation when the work to be done is so pleasant.

MR. WILKINSON, Niagara Falls: Regarding options, there is a difference of opinion between the president's idea of options and the secretary's, and my idea is that the secretary is absolutely right—that the thing should not be indefinite; if we are going to take up resolutions here of some officer, we will take the horticultural societies' affairs out of the hands of the local societies and be in a good way to kill the society. I think that Mr. Wilson, being the originator of the Association, we should look to him for advice, and he has so far led us along the right lines. My opinion is that options should be continued.

Mr. WILSON: It is the privilege of men to differ. My address was the report as superintendent. I believe in options. It is a matter which is left entirely in the hands of our local societies who are looking after their own interests. If you think it is a good idea to give trees, shrubs, and flowers to your members, you are complying with the Act, which clearly states that is part of your work.

T. J. HANNIGAN, Guelph: I think perhaps that note in the president's address was due to inexperience on his part in the work of horticultural societies. We have all admired the beautiful flowers that he grows at his place at Port Perry, and he has done a great deal for the flower growers from that standpoint, but he did not come up through the horticultural societies the way a good many of those here have done, and therefore is perhaps not cognizant of the struggles of a great many of the smaller places to get horticultural societies going. I know in some of the rural places, if they did not in addition to giving options on flowers, give strawberry and raspberry and other plants, they could not exist. The premium that pleases in one place will not always suit another. Each has to work out its own salvation in that line.

MR. MCKEE, Sudbury: In my opinion this is a matter of home organization. Mr. Kent compiled a little catalogue of dahlias and gladioli from the time of planting to the time of blooming. That helped us greatly in Northern Ontario.

Mr. McKee asked whether the Society would support a research farm in Northern Ontario.

CHAIRMAN suggested that Mr. McKee get in touch with the district director and get a resolution to be placed before the Resolutions Committee in reference to the research idea.

C. A. BYAM, New Liskeard: I understand that there is a proposition to rearrange the districts, but that only affects the lower part of the Province. We are all proud of course of our Province, but we feel handicapped by the size of our district. The district I have the honour to represent is 480 miles long and reaches to James Bay. We feel the time has come when the advancement in the North warrants a division of our districts. Mr. Bailey represents a district twice as large as mine. I got into the Sudbury district but I found it impossible to get to Parry Sound or Manitoulin Island. I would suggest that Districts No. 9 and 10 be changed as follows:

That District No. 9 comprise Nipissing, Muskoka and Temiskaming, and that a new district be made comprising Manitoulin Island, Parry Sound, Algoma and Sudbury, and that Mr. Bailey's district comprise the western part of the Province. This will cost very little because the northern directors don't come to the meetings of the association except at the annual one.

MR. WILKINSON said he had at the previous annual meeting given notice of motion in connection with change of District 4. I think that every one of us who is interested in the Horticultural Association that are here to-day will agree with the delegate who has spoken from New Liskeard that the districts are altogether too large. There is Essex and Kent. In my opinion that is about all that any one would want to handle to give service. I think that a general revision should be done, not only in the Niagara Peninsula, but the whole of the Province should be rearranged because, as I said last year, the societies are going ahead with leaps and bounds. We can show you some of the greatest transformations in our section that you would hardly believe. Take Chippewa for instance, you would hardly know the place, they have made such wonderful progress and improvement there. I am wrapped up in this association. It is one of the greatest organizations this Province has ever produced, and my ambition is to do everything in my power to make it cover every nook and corner in this great Province of ours. He then moved:

"That the districts be rearranged so as to provide for greater supervision and assistance to local horticultural societies and that a committee be appointed by this Convention to consider this matter and to report to-morrow morning."

MR. HOWARD, of Listowel, seconded, saying: We are all agreed that this is a move in the right direction. There is a demand for lecturers who have some knowledge of smaller places. They are needed for helping them with their shows and the planning of beautification of their local spots. There is only one thing that hinders this work and that is lack of funds. It means they have had to pay the expenses of the director up to the present time.

J. LOCKIE WILSON: This matter of the revision of the districts is I think an excellent one, and should receive the approval of this Convention, but it is a big proposition, and I would suggest that the committee be carefully selected by the Board of Directors, because this will be a Province-wide movement and it is a matter which should not be placed in the hands of two or three men who are perhaps not acquainted with the different parts of the Province. Although proper notice has not been given for this change, yet I think it would be in the interest of all concerned that a reasonable redistribution should be made.

REV. MR. TEBBS: You cannot expect your directors to visit your societies unless they are notified when you hold your meetings and when you want them. I have gone to societies' meetings for years whenever I am invited. And it is important that there should be a link between directors and societies, that they be notified of meetings.

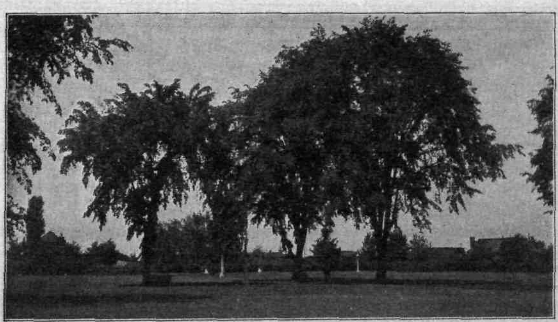
MR. EMLOW, Hamilton: The one thing in the report published by Mr. Wilson was the modest demands of the directors upon the treasury. This division of districts is needed badly. The only feature I can see against it is the expense and as this has been so very small, it occurs to me that a larger part of the money which comes from the Province could be devoted toward more expert supervision. I am in favour of leaving the matter to the Board of Directors.

It was moved by Mr. Pearen, in amendment to the motion, seconded by Mr. Tebbs: "That the question of the enlargement of district representation be referred to the officers and directors for consideration and that they report to this meeting."

DR. MORROW: Talking about more lectures, I find in my district people are craving for some person who can come on the ground and give them an idea of how to lay their grounds out. We need a lecturer no doubt, but the lecturer should be a man who has sufficient time to tell the people how to lay their grounds out.

There is another question, and that is the judging of flowers at our fairs. We are very scarce of men who make good judges, and I think it would be a very good move to get a number of men taught to be good judges. People are just as much interested in the perfection of their plants as of a horse or cow.

MR. HOWARD: Last year this Association passed a resolution asking for a summer school in Horticulture. Such a school was held. There were not many there, 25 or 30, but those of us who were there were delighted with it. The lectures were excellent and we got instructions along the line that Dr. Morrow has suggested we should get. I commend the school and hope that it will be continued again.



Stately Shade.

DR. BROWNLEE, Grimsby: While the small places cannot always have a lecturer brought to them, nearly every Society has some one who is specially interested in some line of horticulture, and these speakers could be exchanged.

MR. KEELER, Brockville: It seems to me that assistance for horticulture is very much in demand. We have been very fortunate in our district in being able to secure information and assistance that is so much in demand, through our district agricultural representative.

MRS. KNOX, Creemore: Asked if there was a constitution by which each society should be governed, and if so, if the presidents and vice-presidents are aware of it. She felt this would be a good thing, especially for the younger societies.

MR. SIMPSON, Past President: A considerable amount is left to the discretion of the individual society, but all the conditions of organization are set out in the Horticultural Societies' Act, not so much with respect to the conduct of the society as its organization.

The form of procedure is pretty well set out in the Act and provision is made for almost any contingency. There is a good deal to be said for a general constitution of the societies. It is something that we know societies could receive guidance from by adopting constitutions in use by the older and more successful ones. The principles embodied in those constitutions would be found to be of pretty general application. Mrs. Knox's suggestion is worthy of the attention of the incoming directors.

MR. CRUSE, Hawkestone, suggested the interchange among the societies of various people who knew how to intelligently discuss different subjects.

MR. TEBBS said that information could always be given by Mr. Wilson to any society writing for it.

MR. COLLINS, Chatham, suggested that the small societies that would like some help for information should get in correspondence with the director representing their district. As director of his district it had been hard for him even to get replies to correspondence. The people in his district were also anxious to know how to lay out their grounds. They got two landscape gardeners on the job; one man laid the grounds out and the second architect had entirely different ideas. The speaker thought it was largely a matter of personal taste. and that it was not always necessary to get a professional man on the job, as a layman often could do just as well.

MR. LAITHWAITE, Goderich: Last summer I had a visitor come from Niagara, who said, "I called in to ask you how you got your ground so nicely laid out." I said, "The whole secret is to leave it as near nature as possible.

The speaker also referred to the great mistake people made in buying indiscriminately "freaks of nature" in the way of flowers, and nurserymen taking advantage of their lack of knowledge by charging them outrageous prices.

T. D. DOCKRAY, Toronto: I am glad to see this spirit of enquiry on the part of members of the societies as to how they can get in touch with their directors, and on the part of the directors to know more about their societies, and about this enquiry into how the societies can get expert help from outside. This shows a wonderful growth of this spirit of co-operation in horticulture, which is a matter of the last ten years. Perhaps one of the greatest things they can do to increase their own enthusiasm and this spirit of enquiry is to meet frequently, at least once a month, from now until the show season starts. When I was president and asked for news of the societies to use in the publicity work, the reply was so frequently received, "We have not yet organized." I found it was the general state, that all winter they were dormant and then in April the solicitor would promise a few plants or bulbs in consideration of the membership fee.

Your duty is to keep your Horticultural Society alive all the time, especially between now and the planting season.

Another point is when you go home from this Convention, you should know who your directors are and tell your society and make them bombard that man with letters, as to what you are doing and what you should do.

A word to directors that are to be elected: when you are elected get at once the names of the counties you are elected for, go to the secretary's office and find out what horticultural societies are in those counties and write to them, advising them that you are their director and ask them what they want you to direct.

MR. COLLINS thought it might be wise to give each director a list of the societies in his district.

MR. HOWARD, Riverdale, said one of the reasons why Canadian growers do not deal with Canadian houses was that if you take a catalogue issued by a Canadian seed house to-day and compare it with one issued ten years ago there is hardly any difference in those catalogues. New varieties are not included.

DR. MORROW brought up the matter of preserving the natural flowers of our own country, and we have, he said, some beautiful ones. They had a man down in his part of the country who has a garden of the most beautiful natural flowers, among them some wild orchids. I think we have some splendid flowers and shrubs in our own country, and we should, as an organization, try to take some steps to propagate our own material.

MRS. TIER, Etobicoke: Mr. Baldwin last year suggested that we put on a window display. We started in May with our first window display and ended in October. We put on during that time a display every two weeks in our stores. If you want to keep your society before the public this is a splendid way to do it.

MISS HAVILL, Walkerton: When we are out on our membership canvass from year to year, we found many of the members have very little knowledge of the growing of shrubs and bulbs, and when we went around they would say: "Our bulbs and shrubs did not grow and we will not join again." So we issued a pamphlet on how to preserve shrubs and bulbs for winter bloom, in the spring the one for shrubs and in the fall for bulbs. Now we find very little complaint about bulbs and shrubs not growing.

MISS McMARTIN: There is keen interest in our district on wayside planting, and it is a live question as to whether the Government makes a grant of 75c per tree surviving after three years.

MISS MOYLE, Richmond Hill: I have a great deal of sympathy with the remarks regarding wild flowers. Unless something is done we are going to lose them. Anyone who has the misfortune to live on a provincial highway will see Saturday afternoons or Sunday afternoons and evenings hundreds and thousands of motor cars wending their way home and they are loaded down with our beautiful flowers pulled up by the roots, all wilted, absolutely useless for any home decoration and the plants left to die. Can not this Horticultural Society do something to make it a criminal offence for anyone to go into our woods or along the highways, and put a stop to this ruthless destruction.

MRS. THOMAS, Athens, asked if the Government was not largely to blame for this in the way they had put up the highways, saying: formerly the beauty along Lake St. Francis was remarkable, but in putting up the provincial highway they had ruthlessly destroyed the wonderful trees along the highways as well as the flowers.

MISS PRESTON, Ottawa, said they could show some very splendid exhibits of lilies and roses. She was with the Ottawa Experimental Farm and would be glad to be of help to any members of the society.

MRS. MULHOLLAND, Mimico, asked the member who had had the continuous window display, if they got their flowers from members, to which she responded that they just simply put a tag in the window where the next show would be, and flowers were sent in with the name of the donor on the tag and they kept track of those who donated. We gave ribbons of honour.

Asked whether they had done this before, she said: No, this is our first trial. We are not in favour of giving prizes. Our people do that for the love of showing.

Mrs. Buffam, Perth, said they had conducted from "Snow to Snow Window Displays." They start with the snowdrops, and had had splendid store windows. That was thanks to Mr. Simpson's address, and it was he who made the "Snow to Snow Exhibit" suggestion.

CARE OF HOUSE PLANTS

William Allan, Toronto

The ideal conditions for house plants are practically the same as for human beings, that is a temperature of about 60 to 65 degrees during the day time, 45 to 50 degrees at night. It may not always be possible to maintain this warmth at night, but strive to keep as near it as possible.

During the winter have a care that none of the leaves of the plants touch the glass during the night, or when there is a frost outside, because it will at least chill and very likely kill them. On very cold nights move the plants away from the window, and put newspapers in front of the glass. This will prevent any material damage to your plants.

Another great consideration is fresh air. Keep the room ventilated, have a window partly open somewhere in the room at times, preferably on the opposite side from the plants, for they cannot stand draughts. When plants are grown in a very high temperature with moisture the growth is forced and being soft is easily injured. A strong draught, even if only ten degrees cooler than the surrounding air, will seriously chill the plants in this condition. The result will be that plants, such as Geraniums, will turn yellow and drop their leaves; with plants such as Palms, Aspidistras, the tips of the leaves will turn brown. To get the plants back into proper condition will take months of careful attention and in the case of Palms or Ferns it may take a year. To give the atmosphere the proper amount of moisture have a small dish on the radiator, register or stove, and keep it full of water.

Another most exacting requirement of plants is watering. Too much water will make the soil sour. With too little, the plant will wilt. The effect of either will be yellowing and dropping of leaves. No hard and fast rule for watering can be made. Plants may need water twice a day, or only once in two days. The best way to determine whether a plant is dry is to rap the pot sharply with the knuckles of the hand—a hollow or ringing sound shows the soil needs water, a heavy dull sound indicates that it has sufficient moisture. Usually you can tell whether the soil needs watering by looking at the surface. If it is dry and powdery give water. The common fault in watering is not doing the job thoroughly. Never give a little surface sprinkling. The best way is to take the plants to the sink or bath tub and give the soil a thorough good watering, allowing the plants to stay in the sink until the water has drained off. If it is impossible to do this, have a saucer under each pot. After watering, go round and turn out all the water standing in the saucers. Never allow water to remain in the saucers as it will prevent aeration through the hole in the bottom of the pot. When plants are kept in jardinieres people often grow careless, let water collect in the bottom and wonder why the plants are not doing well. If by any chance the ball of earth should become very dry, plunge it in a pailful of water and let it stand five or ten minutes until the whole ball is soaked through. When air bubbles cease to rise, the ball of earth is thoroughly soaked. Pouring water on

the top of the soil of a dried out pot plant is generally useless because the ball contracts in drying and leaves a small space between itself and the pot down which the water will run.

Sponge the leaves frequently to remove dust, particularly Palms and Aspidistras, both upper and underside of the leaves, carefully rub over underside in particular. If necessary a little soap may be used in the water.

Good soil is an absolute necessity to success with plants. A good workable soil may be made from loam, sand and well rotted horse manure. It will be better if it has an addition of leaf mould. This can be obtained in the bush. Well rotted leaves make a splendid compost. Before repotting your plants be sure the drainage is perfect; in the bottom of each pot put some coarse drainage. Broken pots are usually used for this, coal clinkers or stones, also broken charcoal

President's Garden.

will do. If you use broken pots place the pieces in with the convex side up and over this place some coarse screenings to keep the finer soil from washing through into the drainage. On top of this place some good sphagnum moss.

Do not work on the principle that the larger the pot and the more soil, the thriftier the plant. It is not the amount of food available, but the amount assimilated that counts. As a rule any pot which seems to be in proportion to the plant, holding sufficient soil to keep it from being top heavy, will do. Most people make a mistake in the size of pot, using one a size or two too large. It is very easy to over pot a plant, strange as it may seem. Nothing in the plant's life can be more disastrous than an overlarge pot; nine times out of ten, the plants will be over-watered and the soil becomes sour.

The best time of the year to repot house plants is in the spring (April or May), or when new growth starts. Only in very exceptional cases do house plants

require repotting during the winter. This is particularly true of Palms, Ferns, Rubber Plants, etc. These plants are then resting, or are making very little growth and to repot them is positively dangerous to their lives.

The average person does not realize this and although the plant is in a good healthy condition, becomes worried because it is not making new growth. Then he will repot the plant and, nine time out of ten, the plant becomes sickly and often dies in a few weeks because of the shock received.

Insects are a source of trouble to many of the house plants. Red Spider is one of the most destructive—a very tiny red mite which can scarcely be seen by the naked eye, but its presence can readily be told by the numerous minute yellow spots on the upper side of the leaf. Like the aphis, the red spider subsists on the juices of the plant. It thrives in a hot dry atmosphere and the conditions ordinarily found in living rooms are very favourable for this pest. The remedy is to syringe the plants with water, applying it on the underside of the leaves and with considerable force because the insect is protected behind a web. The commonest insect enemies of house plants are the plant lice or aphides. Look for these pests on the underside of the leaves. Remedy—use tobacco water or soap suds. If soap suds are used rinse the plants with clear water afterward. Always bear in mind that during the dull dark days of winter your plants must be watered with great care. It would be much better to invest in a rubber plant sprayer and sprinkle their leaves than to be continuously flooding their poor roots which are trying to recuperate by a needed rest for another season's work. Also remember not to allow water to stand in the saucers as it chills and rots the roots. Be sure your plants get plenty of air and at the same time guard them from draughts.

THE VALUE OF EVERGREENS FOR LANDSCAPE EFFECTS

A. H. TOMLINSON, Associate Professor, of Horticulture, O.A.C., Guelph

Conifers or cone bearing trees are familiarly called evergreens because of their continuous leafage in bright golden or sombre verdancy. A few species only, however, possess this glorious mantle for a season, thus in winter they are bare and include the Japanese Gingko, Larix (Tamarac or Larch) and the Taxodium distichum (Bald Cypress).

Canada means more to us because of its evergreens or, as they are often called, "softwoods." These have helped to make Canada famous for her timber, forest lore, and beauty of the landscape.

The Dominion possesses some wonderful native evergreens which respond well in her midst in one spot or the other.

The writer has often asserted that the Province of Ontario can be made the home of all hardy forms, both native and exotic. Among species found growing naturally in Ontario are the stately and feathery five needled leaf pine (Pinus strobus); the red pine (Pinus rosinosa), with its three long needles and trunk of reddish bark; the silvery green leafed white spruce (Picea alba); the ever beautiful fountain-like hemlock (Tsuga Canadensis) like the biblical cedar of Lebanon; the varied common cedars or arbor vitae (Thuja occidentalis) which are par excellence for all purposes and so pleasing in form, foliage and odour as the erect soldierly variety T. paramidalis, and dense forms as T. Wareama, T. Vervaeneana, also the compact dwarf forms as T. Hoveyii, T. Ellwangoriana, T. lutea, and

many others which should be popular. Then there are the fastigiate and trailing junipers; the former comprise the red cedar (Juniperus virginiana) and blue form J. vir. Glauca, also the common juniper (J. communis), whilst among the procumbent forms are J. Vir. horizontalis and J. com. depressa. Ontario's Yew tree is a bushy spreading evergreen which delights in the partial shade of tall trees. The twigs of the yew are most interesting in fall when the pinky arils or berries are attached. Many other Canadian species flourish in Ontario and are from the Pacific slope as the B.C. or Douglas Fir (Pseudotsuga douglassii), with an attractive conical form with beautiful glaucous new shoots early every summer; the erect and compact B.C. cedar (Thuja plicata), with its foliage of deep verdure; the majestic yellow or bull pine (Pinus ponderosa), perhaps Canada's best pine, with its long needles three in a fascicle. Lastly the Rocky Mountain spruce (Picea engelmani), is most interesting with metallic blue foliage.

Possible the most appealing evergreens indigenous to America have yet to be thought of. Such include the magnificent blue spruce (Picea pungens), of silvery glaucous and greenish blues, the most lovely being Koster's variety (P. pun. Kosteriana), which is always propagated vegetatively to ensure trueness to type. The princess-like Silver fir (Abies concolor), with its charming artistic foliage is almost without a peer. At the O.A.S. adjoining Macdonald Hall, the southern white cedar (Chamaecyparis thyoides), with its fern like sprays is most refreshing.

Of European evergreens, many varied species and varieties will grow with us, notably the Norway spruce (Picea excelsa). Its zenith is in June, with its drooping branchlets of yellowish green. The Austrian pine is a fairly long lived tree with foliage in pairs of dark green. The Swiss mountain pine (Pinus mugho), is unbeatable as a dwarf conifer for effect in groups or adjacent to buildings. Yet, another Swiss pine (Pinus combra), in classical columnar design, is most desirable for architectural planting. Sweden has its representative in Juniperus suecica of green and glaucous leaves and is like a glorified common juniper. Ireland's juniper (J. hibernica), like the Irish Yew (Taxus hibernica), is pretty indeed, but does not like Ontario's colder parts. For rockery use among European procumbent junipers J. temariscifolia is paramount, although its progenitor, Suvin's variety (J. Sabina), for low group planting is much esteemed.

So one may go on! But something must be said of oriental evergreens! The very hardy Japanese Yew (Taxus cuspidata and variety brevifolia), without doubt are most happily suited for medium height and entrance planting. The eccentric umbrella pine (Sciadoptys verticillata), is at home in sheltered rockeries and among oriental features. The plume Ratioposporas (Chamaecyparis plumosa), is attractively garbed in feathered apparel, also the thread-like leaf variety (Chamaecyparis filifera). Not forgetting the blue foliage Chinese juniper (J. pfitzoriana), still further beautiful evergreens could be given, but enough for now!

A word in planting conifers! A capital time is the late summer or early fall, especially if there is plenty of moisture in the air and on the land or that such can be easily procured. Dry conditions for root and top are not the best, thus watering at planting and later together with daily spraying of the foliage will almost ensure success. A winter mulch or dry litter over the root surface of newly fall planted evergreens helps to prevent root disturbance by frost. Late planting is risky, so simply postpone the operation until spring. Always it must be that thorough work be done for success. Many choose May as the conifer transplanting month.

Soils rich in organic matter are the best for coniferous vegetation. On forms of sand and gravel at times a dressing of rotted manures or leaf mold would be beneficial. During a drought plentiful watering should be indulged in.

Many exotic evergreens need to be planted away from sun-exposed southerly walls. A cool circulation of air is preferable to tropical heat. In winter such conifers ought to be shaded from the sun's rays by brush, corn stalks or similar material. This protection will also aid these tender forms to withstand the ill effects of windstorms. Exposure is not wise for the less hardy varieties. This ought to be fully understood.

Evergreens to be pruned perhaps respond best to this treatment in spring as soon as growth is beginning, although to shapen specimens projecting shoots may be cut or pinched out as they appear. One way to dwarf or balance some species like the spruces is to nip out a bud in spring where offence is likely to follow.

In conclusion, the writer recommends the planting of worth while evergreens for beauty and effect in summer and winter. There is always a place for such whether as trim hedges, friendly windbreaks, cloistered groups or queenly specimens. They are especially lovely in early summer when their varied blossom hues appear with golden or silvery green verdures of the new shoots. In winter the contrast to frost and snow causes them to be a matter of delight and pleasure; most especially so when staged in fairly-like mantle of sparkling frost and immaculate snow. To us the evergreen represents at times a gay and, on other occasions, a grave spirit, but always sublime and resolute. A lesson worth while! May we become more attached to it and them—the evergreens.

THE GARDENS OF ENGLAND IN 1926

REV. GEORGE W. TEBBS, Burlington, Ont.

The charm of an English garden is proverbial. Centuries of care, a perfect climate for most of the flowers we love, and the innate affection of the Englishman for his home and its surroundings combine to produce the garden beautiful unexcelled anywhere.

To describe them properly, would involve a visit from the early spring when the snowdrops, the crocuses, bluebells, primroses, violets, and daffodils cover the borders, the lawns, hedgerows, and the woods, until the late autumn when the imperial chrysanthemums burst like showers of golden rockets to conclude the colourful display of the flowers of the year.

But inasmuch as my visit to England last summer barely lasted two months, I shall be compelled to limit my present story to the pictures my camera registered during that limited period.

There are a few prefactory remarks, however, I would like to make before proceeding to show you the pictures.

TYPES OF GARDENS IN ENGLAND

(a) *Government Gardens.*—The outstanding example of this type which I shall show you, is of course the world famous Royal Botanic Gardens at Kew near London. The flower lover need go no farther than this wonderful place to have a surfeit of good things. Covering no less than 288 acres, it has been famous

as a horticultural centre ever since John Evelyn in his Diary of August, 1678, mentions it. For many years it was under the control of the Royal Family of England, and was placed under the control of the Commissioners of Woods and Forests in 1840 at the request of Queen Victoria. Since 1903 its control has been vested in the Ministry of Agriculture and Fisheries.

(*b*) *Municipal Gardens.*—Large sums of money are being expended annually everywhere in England by municipal authorities on their public parks and gardens, and are places of wonderful beauty, extent and design. Their educational value is very great to the people of the towns and cities and are visited by large numbers throughout the summer months. I shall illustrate these from the city of Southport, a seaside resort in Lancashire, and the city of Leicester in the Midlands.

(*c*) *The Gardens of the Nobility.*—The majority of these are very stately and formal. Admission, however, to view them may be obtained if the family are not in residence, and one conforms to the regulations governing such admissions. As these beautiful gardens are not in the amateur class, I shall largely pass them over on this occasion.

(*d*) *The Gardens of the Middle Class.*—Land is very valuable in England, and consequently it is only when the residence of the middle classes are in the suburbs or in the country that they are large in extent. But what they lack in size is fully made up in intensive gardening. Every nook and corner is used. Many of them employ part-time gardeners who have a list of clients, making their rounds from one to the other during the week.

Many of the gardeners of England have been in the business from boyhood, and while only in possession of a common school education are past masters in their knowledge botanically of the flowers they tend. They succeed because they love the flowers. Some of these gardens I shall show you presently, and you will at once recognize the thoroughness and variety of their work. The employers being fairly well to do, and being themselves enthusiastic horticulturists, they select only the very best of seeds, plants, shrubs, and vines.

(*e*) *The Exclusive Amateur Garden.*—In these gardens I found the owner a man who was a specialist in one particular line of horticulture. Sometimes in roses, others gladioli, delphiniums, asters, phlox, dahlias, chrysanthemums. It was very rare to visit one of these gardens where there was not a little greenhouse, and in another corner of the garden a set of garden frames. Neatly trimmed box hedges surrounded the flower beds, and a tool shed with all the tools neatly stored and cared for.

(*f*) *The Poor Man's Allotment Gardens.*—On the outskirts of every town and city large fields have been divided up into allotment gardens for the benefit of the working class people. It is a common sight to see a husband and wife with wheel barrow and garden tools making their way in the evening to do their gardening and gather their produce. Each allotment has its section of flower beds, and often a little greenhouse. A comparatively small annual rental is charged for each lot, which is only divided from the neighbour's lot by a small path or a row of small fruit bushes.

Departmental Work

My own first love of gardening began some thirty years ago when I attended a course of gardening lectures conducted by the County Councils in England. This course lasts about three months, and is given by some expert practical

horticulturist weekly, and is made to cover the whole range of Horticulture. It included practical demonstration of budding, grafting, hybridizing, pruning, etc.

Our Association might well take such an important feature as this into its serious consideration to replace or rather augment the occasional lectures as now given throughout the Province. The Horticultural Exhibitions were a revelation to me of the extraordinary perfection reached in many of our well-known flowers. Exhibitors of rock plants at these shows spent weeks in arranging rockery at great expense for a two-or three-day show.

As a general rule, the nurserymen who exhibit are specialists in one variety of flower, and do not cover the whole range of Horticulture which largely prevails here in Canada. Consequently there is always something of real excellence to be seen in their displays.

At one show I was fortunate enough to see the magnificent Wrexham Dephiniums, and upon being introduced to the exhibitor as a Canadian visitor and a member of this Association was promised a packet of seed from the best novelties of the season gathered from the new crop. I received the same after my return home. I hope to be able to make a report later upon the wonderful new flower.

Many ladies derive quite an income from the sale of daffodils, lily-of-the-valley, violets, etc., in the early spring. They advertise them in all sorts of of magazines and weekly papers.

THE CULTURE OF ROSES

By Henry J. Moore, *Toronto*

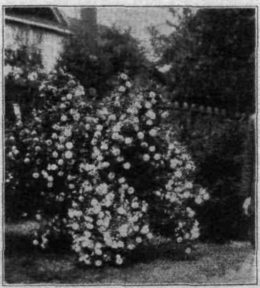
Position.—The best position for roses is a fully sunny one. If such is protected from the prevailing winds so much the better for the bushes during winter and the blooms during summer. Hedges or masses of shrubs afford splendid protection in our colder localities, though not essential if the roses are adequately protected over winter.

Soil.—Roses require a cool and moist soil for best development. The perfect soil is a deep, rich clay loam. Usually such a soil is light in colour and thus is relatively cool in summer, as light coloured soils do not absorb the heat of the sun to any extent. It is also a moist soil, as being composed of very minute particles packed closely together, it will hold the moisture considerably longer than a porous sandy loam. When preparing the soil, dig it deeply and work therein during October or November manure from the cow or pig stables. These are manures which do not heat on decomposition but which give off a lot of moisture. Thus they favour the conditions which are necessary to an ideal soil, namely, coolness and moistness.

Kinds to Plant.—The most popular roses are the hybrid teas, which are crosses between the hybrid perpetuals and the true tea scented roses. They have inherited some of the hardiness of the former and much of the free blooming quality of the latter. They bloom from June until October. The climbing roses are perhaps a good second with the dainty polyanthas and the rugged hybrid perpetuals, but less free flowering types following. The baby polyanthas are fast increasing in popularity and merit a more general use on account of their free blooming qualities and extreme hardiness.

PLANTING.—April or early May is the best period to plant roses in our colder winter localities. In mild localities November planting is equally as good. Dig the holes so deep that when the roots are in position the bud-graft is two inches below the finished surface of the soil and so wide that the roots may be spread out so that they radiate from the root stock. Fork the bottom of the holes loosely and place therein a layer of fertile soil. Cut away all broken roots and immerse the plants in water for an hour and when planting keep the roots spread well apart by means of fine soil placed between. Having tramped and firmed the soil, water it adequately. Always plant roses firmly and in such a manner that the roots are not cramped. Plant hybrid perpetuals three feet apart; hybrid teas and baby polyanthas two feet apart.

DORMANT PRUNING.—As roses flower upon the current year's wood it is necessary to prune in spring. April planted roses should be properly pruned when planted. If autumn planted the stems should be shortened somewhat and in April proper pruning be effected. In all cases remove the dead and weakly growths first, leaving in the case of the hybrid teas three or four of the strongest,



Pink Tausendschon.

and shorten these three inches above the graft. In the case of the hybrid perpetuals leave five or six strong ones and shorten these six inches or so above the graft. Always see that the remaining growths are well spaced and shortened above a bud that points outward. During subsequent years prune away the growths of hybrid teas or hybrid perpetuals respectively the same distance from the wood of the previous year. Prune the baby polyanthas in April by simply cutting away all dead growth. From climbing roses the dead and weakly canes should be removed at the same time.

SUMMER PRUNING.—Summer pruning is practiced to cause a continuity of bloom in the case of the hybrid teas and baby polyanthas and also to favour the production of basic growths which the following year will produce flowering growths. As the flowers fade they should, whether as individuals or trusses, be removed by cutting the stems above the third leaf down, not later however than late July. This will cause the production of growth which will flower during the current year. During August the old canes of the climbers which

have flowered should be removed and the strongest young canes be trained to replace these. The long and wayward growths of the hybrid perpetuals should be shortened to about two feet in length before winter.

CONTROL OF PESTS.—

(*a*) *Insects.*—To control such as aphides (green flies) which suck the sap, spray with a solution of nicotine sulphate, 1 ounce to the gallon of soapy water, and to control red spiders, spray with the same solution but to which is added a handful of flowers of sulphur, the whole being well stirred. For leaf-eating insects spray with arsenate of lead, paris green mixture, or dust with a mixture of pyrethrum 2 ounces, Paris green 1 ounce, flour 3 ounces, when the foliage is wet.

(*b*) *Fungi.*—The worst fungoid pests of roses are mildew and black spot. To control the former spray with potassium sulphide, half ounce to each gallon of water. The latter with a solution of sal soda (common washing soda), one-and-a-half ounces to the gallon of soapy water, well churned, three times a year —spring, before the bushes flower—summer, at a favourable time when blooms are at a minimum—and late autumn. Remove and burn all infected leaves as they fall.

MANURING.—During their growing season roses may be greatly benefited by an occasional application of a little fertilizer. This may be applied as a solution such as nitrate of soda, one-quarter ounce to each gallon of water, or liquid from stables or manure pile or from a barrel in which a bag containing manure has been soaked. In any case it should be diluted with eight or ten parts of water. Mixed artificial fertilizer or a little sulphate of potash applied during July and raked in just after the peak of blooming is past will work wonders in greatly promoting both growth and the production of later flowers. Every second or third year a good application of coarse bone fertilizer should be applied. Containing lime and phosphoric acid, crushed bones help to neutralize soil acidity and produce large blooms.

Do not rely solely on artificial manures. Every spring, if necessary, fork manure from the cow stable into the soil. Organic matter (humus) is necessary to retain the moisture which roses require. Acting as a sponge, it will hold moisture and give it out gradually.

WINTER PROTECTION.—With the advent of hard frosts during late autumn, protect your bush roses such as hybrid perpetuals, hybrid teas, and baby polyanthas by mounding them up to a height of about ten inches with porous soil, procured from an area other than where the plants grow. Otherwise depressions will be made in which water will stand and freeze and probably cause the death of the subjects. In cold winter localities, protect the canes of climbing roses by laying them down and covering with a few inches of strawy litter. In extremely cold localities a box which will admit air should be placed over the canes. Under no circumstances so cover the stems of roses that air cannot reach them. The covering should be of a pervious nature and never be placed on so thickly as to smother the plants.

CULTIVATION.—Thoroughly cultivate the soil between the roses to conserve the moisture and to admit air. Air is necessary to the life and development of bacteria which aid in the formation of nitrates, the most valuable plant foods. Remove all weeds. Water the soil artificially only when cultivation fails to hold sufficient moisture. Do not spray rose bushes with pure water in

under certain conditions induces the growth of mildew on the leaves at night. The bushes should be perfectly dry by sunset.

SOME GOOD ROSES

Hybrid Teas:
- Madame Butterfly—salmon flesh, shaded to coppery rose.
- Convent Garden—red.
- Lieut. Chaure—rich crimson.
- Madame Ravary—golden yellow.
- Lady Hillingdon—yellow.
- Willowmere—pink shaded yellow.
- Gruss an Teplitz—bright crimson shaded maroon.
- Lady Pirrie—reddish salmon, inside of petals apricot yellow.
- Mrs. H. Stevens—white.

Hybrid Perpetuals:
- Alfred Colomb—bright red.
- Baroness Rothschild—flesh pink.
- Eugene Barbier—deep golden yellow, very large.
- Frau Karl Druschki—snow white.
- Hugh Dickson—brilliant crimson.
- Mrs. John Laing—pink.
- Ulrich Brunner—cherry crimson.

Climbing:
- American Pillar—pink.
- Dr. F. Van Fleet—rose.
- Excelsa—scarlet.
- Paul's Scarlet Climber—scarlet.
- Dorothy Perkins—pink.
- Emily Grey—golden yellow.

Baby Polyantha:
- Baby Faurex—near blue.
- Eblouissant—deep crimson.
- Mrs. W. Cutbush.
- Ellen Poulson.
- Annie Muller and Orange King.

HYBRIDIZING FOR AMATEURS

J. W. CROW, Simcoe

There could be no more delightful hobby for a flower lover than the improvement of one's favourite flower by breeding. To rear something distinctly your own, new and valuable, is to experience the full reward of creative effort.

There is, however, much more in plant breeding than mere pastime and I wish to lay particular emphasis on the possibilities of plant breeding as a business. I shall outline as fully as I can within the time limits several openings which seem to me excellent and to which your attention is earnestly invited.

We in Canada have stepped rather suddenly and perhaps without fully realizing it into a new horticultural era. I suppose there is no country which is to-day building homes so rapidly as Canada, especially in proportion to our population. It is not a complete home, as we know, until a garden is planted and we are fortunate indeed in having so many people who consider a garden essential. Ornamental horticulture has made rapid strides in Canada in the last ten years and we have now from within our own borders a far more active demand for new and better plants than is generally recognized.

I had intended to mention at this point the leading horticultural firms which are at present engaged in commercial breeding but have been astonished myself to find the list far too long for inclusion in this address. One could name a hundred or more prominent firms and individuals in Great Britain, Ireland, France, Germany, Holland, Belgium, United States, Australia and other countries who are engaged seriously in the origination of plant novelties. It is not generally realized, to mention only a few, that such rose firms as McGredy, Dickson and Pernet-Ducher carry on hybridizing as an essential part of their enterprise. At least one of these firms raises as many as 3,000 new seedling roses annually. In irises, such noted firms as Vilmorin, Millet, Bliss, Denis, Perry and others carry on continuous, systematic breeding operations. Messrs. Kelway, Wallace, Sutton, Blackmore and Langdon, Lowe and Gibson, Allwood, Unwin, Watkin Samuel, Lemoine, Pfitzer, Diener and Kunderd are all commercial plant breeders, catering especially to the market for novelties. Most foreign introductions come to us from climates milder and sometimes much milder than our own so that from this standpoint alone we have the best of reasons for undertaking hybridizing on our own account.

With many plants it is a very simple and easy matter to raise new varieties, distinct from all others in cultivation. It is, however, much more difficult to improve upon the best sorts already in existence. Any person who intends to enter commercial plant breeding should remember that the only sound policy is to restrict one's offerings to those of decided superiority. Inferior varieties spread disappointment and discouragement. Good ones beget interest, satisfaction and enthusiasm.

The best commercial openings are found among perennial flowers because the prices which may be asked and obtained are not limited by considerations of profit in the hands of the customer. The very high prices sometimes charged for horticultural novelties are not paid by the general public but by skilled propagators and introducers to whom the novelty is an investment. A new gladiolus may sell for $100 each and may actually pay better at this figure than after the price has been forced down through dissemination and increase.

One of the most remarkable examples of improvement is the chrysanthemum, in which the diversity of form, size and colour are most remarkable. At least one American firm is carrying on the breeding of 'mums, but credit for the development of this beautiful flower belongs to the Japanese. The original species were two in number, small flowered and insignificant.

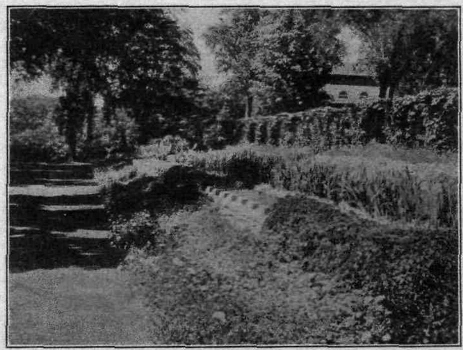
The best modern example which may be cited to show the possibility of improvement by breeding is the gladiolus. There is scarcely a gladiolus variety now cultivated which was in existence before 1895. It was in 1890 that H. H. Groff began gladiolus hybridizing and the marvellous results he accomplished and made possible for others have all come about in the lifetime of persons who are still young. In recent years we have seen further advances, notably in the exhibition type of spike with six-inch flowers and with fifteen or more blooms open at one time.

We have now an army of gladiolus breeders and while we are no doubt due for a flood of second rate and inferior varieties, there is still no danger of exhausting the potentialities of the plant. I note that in addition to the very desirable new "laciniated" type put out recently by Kunderd, he now offers two additional types, "Snapdragon" and "Recurvii." I have among my own seedlings two types which I believe to be entirely new and distinct. One new variety now on the market resembles a tulip flower much more closely than it does the ordinary type of gladiolus. There are a number of fall-planted, spring-blooming gladiolus

species which offer unusual possibilities in the development of types suitable for greenhouse forcing.

As to perfume, there are no less than five South African wild species which are scented and there is every reason to believe this quality can be worked into the large-flowered types if desired. Gladiolus tristis, G. recurvus and G. spathaceus are sweet scented, the first named in evening only. G. alatus has a quaint scent like summer apples and G. maculatus has a decided freesia perfume.

One of the most promising fields in plant breeding is in roses. I know of only two hybridists in Canada other than myself and six in the United States working for hardy, disease-resistant, outdoor roses. Miss Preston at the Central Experimental Farm, Ottawa, is working with Mr. Macoun and Mr. F. L. Skinner is carrying on with roses and several other lines at Dropmore, Manitoba.



At Rideau Hall.

In order to stimulate interest in rose breeding and in order to bring home to rose lovers the commercial value of new originations, I have laid before the Ontario Rose Society the following offer which I here repeat as it is precisely in line with the object of my address:

For a new rose of Canadian origin which will meet the specifications set forth in any one of the three classes hereinafter mentioned, I hereby offer through the Ontario Rose Society the sum of $1,000.00 in cash.

CLASS 1.—A hardy climber, reasonably free from disease and with flowers of or approaching hybrid-tea quality.

CLASS 2.—A bush rose as hardy as the old H.P.'s and with the free recurrent-blooming habit of the modern hybrid-teas. This rose must be meritorious in all respects.

CLASS 3.—A recurrent-blooming bush rose of reasonable all-round merit and with pronounced resistance to both mildew and black spot.

The sum mentioned to be paid on the day the award is made by the committee of adjudication. The donor to be granted the exclusive right to take buds and wood for propagating and to propagate the same for a period of five years only.

This is not a prize given by a philanthropist but a straight business offer. A new rose meeting the requirements indicated would easily be worth the amount stated.

The most difficult phase of rose breeding is probably that of developing varieties resistant to black spot and mildew. I have been testing varieties and species rather extensively in this connection and so far have failed to find any *hybrid-tea or hybrid-perpetual* which is not more or less seriously subject to one or both diseases. In an address given before the Ontario Rose Society on January 20th, 1927, I presented detailed lists of varieties and species found subject to disease and of those found resistant. This information may be had through the Ontario Rose Society, and in addition I shall be pleased to make available to any person who may wish it all the information I have on methods of rose breeding.

Another important field and one in which very little has been accomplished up to the present time is lilies. Many workers have experimented in cross-pollenizing lilies only to find that many of the finest species entirely refuse to set seed. In other cases, the stimulus of pollenation has resulted in seed production but without any real cross-fertilization being effected. The resulting seedlings are identical with their mother parent and strictly speaking are, of course, only multiplications of it.

Miss Preston at Ottawa has several crosses in lilies to her credit which have not been made elsewhere, and has established a unique record by producing and flowering seedlings of lilium tigrinum which has long been considered completely sterile. The Regal lily has been hailed as the most important new introduction in hardy lilies in many years. Fortunately, this species hybridizes freely with its near relatives which include L. Sargentiae and L. sulphureum. The last named is considered tender but has been flowered successfully for several years by Mr. J. Jamieson of Hamilton. This lily flowers in late August, growing to a height of eight feet with flowers resembling Regale but much larger in size and pale sulphur-yellow in colour. It propagates by means of bulbils which are produced in large numbers in the axils of leaves on the upper part of the stem. There is therefore the possibility of deriving from these two species hardy lilies ranging up to eight feet in height, covering by succession a blooming period of six to eight weeks and propagating with great rapidity.

L. Sargale, a lantern slide of which will be shown later, is a hybrid of Regale and Sargentiae and ranks as a greatly improved Regal with dark brown anthers derived from Sargentiae and distinct from the yellow anthers of Regal. It is taller and larger than Regale and two weeks later in blooming. It is a rapid propagator but does not produce bulbils like its Sargentiae parent.

There is no doubt that certain other species of lilies offer remarkable opportunities and I look for great development in these beautiful plants.

Those of you who have grown delphiniums are aware of the great advances of recent years, and it would appear that the cult of the delphinium is scarcely more than well begun. Hitherto this stately flower has provided the pure blue colours so much in demand in the mid-summer garden. We are hearing now, however, of delphiniums with a colour range embracing white, pink, yellow, orange, salmon, scarlet, crimson, mauve, purple and even pure black, in addition to the light and deep blues already so well known.

These new colours are coming out of crosses of the tall blue with two of the scarlet species, cardinalis and nudicaule. There is also yellow derived from the species Luteum. Single and double flowers are described in ruffled, plain

and aster-petalled. There are spring-blooming types suitable for forcing and the delphinium season from all appearances will soon extend from spring to fall.

The advances promised in delphiniums are nothing short of sensational and when one is permitted to add that some of the newest are fragrant the modern horticultural wonder becomes complete.

Reference has already been made to bearded irises and the indications are that in this case also development is only well begun. Non-bearded irises include many attractive species, some of which promise most interesting results from the standpoint of durable flowers suitable for commerical cut flower purposes.

Among modern dahlias and peonies I tread as one bewildered by their infinite variety and shall pass them over without further comment.

Other flowers which seem to me to offer remarkable potentiality are the following:

Hemerocallis varieties are described as pale yellow, rich yellow, orange-yellow, orange and orange-crimson and the end of the colour range is probably not yet in sight. One U.S. breeder claims a variety which flowers continuously from June to frost.

The many varieties of large-flowered clematis are by no means so well known as they should be. These flowers are magnificent for decorative purposes and will last for days as cut bloom. There are numerous species available for crossing which have all the hardiness and vigour of growth which could be desired. There is every reason to believe that the robustness of these types could be worked into the large-flowered varieties and that we can eventually have magnificent climbing plants satisfactory in every way and blooming continually for several weeks if not longer.

We have only a very few early flowering chrysanthemums suited for garden culture. There would seem to be no reason why these could not be greatly improved by crossing with the numerous greenhouse types in all their varied range of colour, type and size.

The columbine too is receiving attention. The long spurred types are exquisitely dainty and graceful. Miss Preston at Ottawa is using the very early flowering species and promises us new sorts three weeks earlier than our present varieties.

Luther Burbank claimed to have crossed the Oriental and Iceland poppies and to have developed therefrom Oriental types blooming continuously throughout the season. I have his hybrids under test but they have so far shown no tendency to bloom after June. It would seem reasonable to expect, however, that this result can be achieved and the effort is no doubt well worth making.

The tropical water-lilies are gorgeously coloured, pink, cerise, red, lavender, lilac and blue. Individual flowers measure from seven to twelve inches across. In spite of their southern origin they can be grown in our climate if properly looked after and offer most interesting possibilities.

The spring-blooming species of perennial phlox have been crossed already with the fall-blooming, brilliantly-coloured varieties and we have here another garden flower which is likely soon to be available in gorgeous colourings from spring to fall.

Other interesting groups are dianthus, penstemon, perennial scabious, foxglove, tritona and even geranium. The pelargonium, or Lady Washington geranium, will not cross with the zonal type, but until all allied species have been thoroughly tested I shall not give up hope of seeing the two brought into combination through one or more intermediary species.

Much more might be said and many other interesting possibilities pointed out. The important thing, however, is to choose your speciality and get started. Do not be afraid of a crowded field as the best openings are certainly among the flowers which are in strongest demand. Study varieties and species. Collect all you can. Test and observe them thoroughly. The great trick is to know which two plants to cross together and the only guide is to know varieties thoroughly. If you make the right combination you cannot fail to get results. Use the best material available, otherwise you are wasting time in covering ground which has been already traversed.

The second great trick is to grow your stock. It is surprisingly easy to lose a valuable lot of seedlings by damping off or by some simple preventable accident.

There is no known rule as to which parent the progeny of a cross is likely to resemble in habit of growth, disease resistance, colour, hardiness or any other quality. Individuals of the same parentage may show extreme variation and one lot of seeds may produce plants showing wide diversity in all characteristics.

Do not be afraid of "Mendelism" or any other of the preachments of scientists. Animal breeding and poultry breeding were carried on for many generations before the modern scientist arrived on the scene, and it is encouraging to note that science has not yet offered any substantial criticism of the methods of successful animal breeders.

The principles of mating, so to speak, are precisely the same with plants as with animals. Choose parent varieties with the greatest care. If one parent is defective in a given characteristic make sure to offset that fault by a corresponding excellence in the other parent. Your aim is to secure the best possible combination of desirable qualities.

As a general rule a plant will not hybridize with a different species, especially if the relationship is at all distant.

The actual operation of hybridizing is in most cases very simple. There is no mystery about it in spite of the secrecy with which some breeders surround their operations. I shall describe briefly my own methods of pollenizing and shall refer particularly to roses and gladioli. Other plants will require some modification of method but the general idea is more or less the same for all plants mentioned herein.

Hybridizing

All roses I have worked with shed their pollen in the bud, sometimes two whole days before the flower is due to open. It is necessary to remove the pollen of the flower you wish to use for seed purposes so that it will not reach the pistils and nullify your work. The petals and stamens must be removed while the bud is still comparatively small and before it has begun to expand to any extent. I use sharp-pointed tweezers to remove the petals and a blunt pair to remove the stamens. A good hand lens is necessary in order to make certain no pollen is allowed to remain. In gathering pollen for use on other varieties care should be taken that the flowers from which it comes have not been open to the visits of insects. I pick fully developed buds just before they open and take them indoors for the removal of stamens. These are collected in small tins such as druggists use. I place the open tins in a sunny window, with a screen over them to prevent insects scattering and mixing the pollen. I write the name and the date on both the outside and the inside of the cover, using a gummed sticker so that the writing will be easily read. When I go to the field for pollenizing I

place the covers on the containers and use the greatest care to see that direct sunlight does not fall upon them. Exposure of the closed tins to the sun's rays would quickly destroy the pollen. I find that rose pollen if carefully preserved in the manner described will retain its viability for several weeks or even months. It must be thoroughly dry to prevent moulding in the closed tins.

For pollenizing I tap the box gently against my hand so as to leave a coating of pollen on the inside of the cover and simply touch the prepared pistils with this pollen. I use small squares of light cotton or linen for protection against insects after pollenizing, tying the covering in place with the string of the label used for recording the cross and the date. These coverings are usually left on until the hips are ripe. I record all crosses in my note book with the number of flowers pollenized in each case. Otherwise they are easily lost tract of after the bushes have put out their new branches and foliage.

Rose seed should remain if possible on the plant until it is thoroughly ripened. Early frosts in fall seem to destroy the vitality and I cover valuable hips on frosty nights.

The germination of rose seeds was formerly a very difficult and serious obstacle for rose breeders. The seeds of some roses do not germinate in nature until the second spring and they lie in the ground three or four years before sprouting. This matter of delayed germination has been studied by Dr. Wm. Crocker, now head of the Royce Thompson Institute for Plant Research at Yonkers, N.Y., who finds that rose and certain other seeds require to pass through a period of after-ripening before they are ready to germinate. This after-ripening process will continue at a temperature of 42 degrees Fahrenheit or thereabouts but is completely checked by temperatures above 50 or below 40. Dr. Crocker states that in his experiments rose seeds stored moist at this temperature begin to germinate in 60 days or less and that germination is complete in 150 days. This is very important information for the rose breeder.

Dr. Crocker finds that germination takes place better in imported granulated peat than in any other substance which has been tested. I sow my seeds in peat and store them in a pit in the ground which I am able to keep at the desired temperature by the use of an electric lamp. Rose seedlings are very delicate and prone to damping off. I was delighted last year to find that peat seemed an excellent preventative of this trouble. At any rate I have no losses from this cause since using it. I grow my rose seedlings in peat until they are three or four inches high before transplanting to garden soil and find this much safer.

The precocity of rose seedlings is very remarkable and surprising to those who have not been aware of it. It is not uncommon to have seedlings flower at eight to ten weeks from germination. These flowers are of course small but are fequently followed at short intervals by others so that it is often possible before the end of the first season to know what your seedling is like as to form, doubleness, colour, perfume, etc.

Gladiolus flowers open in the very early morning but the stamens do not usually shed their pollen until about seven o'clock or later or until the atmosphere becomes dry enough. It is necessary to get about early and remove the stamens before pollen is present. There is then very small chance of insects bringing foreign pollen to the pistils you intend to use for crossing. To make doubly sure of safety, I fasten the pistil out of the way of insects by attaching it to the petals at one side of the flower, using tooth picks for pins. The pollenizing may be done at once or at any time during the day or even the following day as the pistil remains in good condition for fully this length of time. I handle gladiolus pollen exactly as described for rose pollen, but it retains its viability for

only a few days. The gladiolus seed pods are mature in about thirty days and must be harvested before they crack open and lose the seed. Gladiolus seed is very easy to germinate sown in early spring in shallow drills and covered from one-half to three-quarters of an inch. I find I can get perhaps fifty per cent. of the seedlings to flower in the second year. The others will flower in the third year and a very few perhaps may take longer. It is very unwise to pass final judgment on a gladiolus seedling in its first year of bloom. After you have flowered it for three seasons you should have a fairly good idea as to its value.

ADDRESS

HON. JOHN S. MARTIN, Minister of Agriculture

I know you will believe me when I tell you that I have always enjoyed the meetings of the Ontario Horticultural Association. I have been very much interested in this association, and it has a record made of great progress and achievement. When we stop to think that the association has only been in existence for twenty years and consider what has been accomplished in that short span, it is hard to realize, and it has only been brought about by the faithful efforts of those who have put their hearts into this work. I was looking up the figures of the association, and I find that ten years ago—it was ten years old—and at that time you had in the neighbourhood of eighty societies and a membership of about 16,000. Now the eighty societies have increased to 280 and the membership is now 70,000—a wonderful record, and when we realize that this work has been accomplished not by paid organizers but by men and women who did this with the idea of public service and with the love in their hearts for flowers and beautification, it makes it all the more wonderful. At the same time, perhaps it is this idea of service, and this wish to make our country a more beautiful one, that has accomplished the results that we have to-day. It certainly has been brought about by the most wonderful co-operation.

We all appreciate very much the splendid co-operation which we have had between the officials of the Department and those of the societies, not only the officers of the societies but their members. I have been impressed from year to year by the splendid feeling which has always existed between the different societies and the members of the association, and I think that is a splendid tribute to our worthy superintendent, Mr. Lockie Wilson, and also to Mr. Moore, who is doing yeoman service in this province, and I feel that a very happy choice was made, and that we did good service to the horticultural societies by engaging the full time of Mr. Moore.

As you know, we are endeavouring to extend the activities of the horticultural societies out through the townships, and two township societies in my own county have recently been organized—one in St. Williams and one in Vittoria, very small villages. But we had very successful meetings, and those societies to-day are not small ones. One of them, I know, started off with 100 members, and they are going ahead with splendid prospects of future success. So that this your work is reaching to those who live out in the country, township societies, and it is wonderful to see the improvement that is being made in these new societies. The work is extending north, and more and more demands are being made for lecturers—people are thirsting for a knowledge how to do these things.

We have applications now for four societies in Manitoulin. One has already been formed this past summer.

The time has come when the work will have to be extended farther north. It is wonderful work—that work of beautifying our Province—because we know the old saying that "men can not live by bread alone"—it is a fact we are living to-day in very strenuous times, so that there never was a period when business men had a harder fight for existence than they have at the present time. Adjustments are taking place. Conditions are changing, and methods that would have done ten years ago are absolutely useless to-day, and men have to have their wits about them. They have to work hard, and figure out new ways of doing business. Men are living at high tension, and there must be some safety valve, otherwise they blow up. We are continually seeing men dropping off

Peonies in bloom.

daily, through no other cause than too close attention to business. It is a splendid thing that there are outlets for what we might call a disease of this kind, and there is no finer outlet than agriculture or horticulture, because it is not the privilege of many to go in for farming, and too often when business men go in for farming they find that instead of relaxation they have added to their business troubles. I have seen that happen many times. But they can go as far as they like in horticulture, in gardening, raising flowers, raising vegetables. I will never forget a cartoon which I saw some time ago about two brothers—one lived in the country, one in the city. The one in the country farmed a 200-acre farm, the one in the city had a back lot 20 feet by 80 feet, and he had a garden there. The brother in the country had just received a letter from his brother in town. He told him how busy he was, that the did not know which way to turn. The garden was pictured, he had a patch of cabbage, corn and the usual layout. And his brother in the country, he was leaning on his hoe, and

he was just starting out to hoe a ten-acre field of corn. When he read the letter about the brother being so busy that he did not know which way to turn, all he said was, "Gosh "

But following along that line, it is a great thing that men and women are turning their attention more and more to matters of this kind. Of course it simply is a stage in the progress of this country. In the early days they had no time to plant flowers. Then it was a hard fight to find their daily bread, when they were tearing out stumps to clear a piece of ground on which to plant wheat and other grain. As the land was cleared up and homes built, those conditions became easier,and then our fathers began to turn their attention to beautification, and true indeed is the expression of that old statesman, Burke, when he speaks about beautification, gardening, etc., that "if we want to build up a love of country we must make our country lovely."

These things develop. They follow stage after stage of progress, and the beautification of this Province is but a recent development, because you do not have to go back many years when we know that not a great deal of thought was devoted in this Province to the planting of flowers. It is all very recent and it is almost, I may say, analogous, it follows the development of the establishment of the horticultural societies during twenty years. There is nothing that will rest a man's mind more than to be occupied with the planting of shrubs and flowers. We are so busy in these strenuous days trying to make more money, that we sometimes forget other things. It has been compared to two clocks—our present age and the old days—the old grandfather's clock standing in the corner with its slow, dignified tick, as compared with the little alarm clock on the mantle which says, "Get there, get there!" That is the motto, I suppose, of our modern age, but we must realize that there is a limit to what the human being can stand, and work of this kind is to my mind filling a most useful part in the work of this province.

I have referred at times to what these associations are doing. We are improving our highways, and our American friends are coming over here, and if reports be true, this summer we will have more than ever, and it behooves us to have our highways and homesteads, everything in order. I don't know, as a matter of fact, where you can find more beautiful highways than we have on our main arteries. They are a delight, not only to ourselves but to our American friends and visitors, who go back home and tell their neighbours what a beautiful country Canada is, and it is a fine thing that they should develop their ideas from this beautiful little garden spot of old Ontario. That is their idea of Canada, and that is as it should be.

We are trying to develop a love of flowers among children, through our juvenile societies. More and more children are competing each year. We distributed last spring over 70,000 packages of flowers seeds. These seeds are sown by the children and the flowers are brought to the competitions in the fall. Our school gardens are developed, but all our young girls as teachers are not as successful as they should be; but I have seen surprised at some of the results that have been obtained. One of the difficulties, of course, are the holidays intervening. That is being overcome, however, in many cases by the women's institutes and other organizations. These gardens are not allowed to drop, but are kept up through the summer. We hope by encouraging the children of the Province, that they will acquire a love of flowers which they will never forget. I have always been a great believer in the idea that to accomplish anything you have got to start pretty young. I know that in the cases of many of the campaigns that have been carried on, the introduction of pure

bred sires, where they have a campaign in a district to introduce these, at the start it is wonderful, but later the trouble is many of these men getting on in years get tired and they have an idea that a scrub is as good as a pure bred animal. It is pretty hard to teach an old dog new tricks, and they proceed to what you might call backslide.

I personally feel that while we have tried to do what we could, yet there is more that the Department, should do. I am not satisfied, of course, with what we are doing for the societies. The question is what can we do to further help the associations. I know your first thought will be larger grants, but it is just possible that there may be better ways of helping you—in the way of additional help in lecture work, to show you how to do these things.

I mention one or two ideas along that line. You have had many discussions, I have no doubt, as to the proper sort of bulbs, etc., to buy, in order to make permanent improvement, and I know of cases where fairly large sums of money were spent and the next year the society had nothing. By spending all their money in annuals they had nothing to show for the money the following year, and it would seem wise policy to pay more attention to the planting of perennials, shrubs, etc., that you will have with you all the time. That is more along the lines of permanency, and that, after all, is what we are aiming at. Of course, you are to be guided largely by what you want to purchase. The association has no thought to dictate to you, and if we do appoint or add to our staff, the whole thought will be to advise you if you want advice, but not to dictate. But from what I know of the association, you are a body of people who are glad to know all you can and to get it from people in whom you have confidence, and I think perhaps that would be of assistance to arrange your flower shows.

In conclusion, I want to say this: I have always been very much interested and pleased at the work that your association is doing. I look upon it as a patriotic work—you are making the Province more beautiful and you are by that act inspiring increasing love and affection on the part of the people for their own native Province, and in that you are doing a patriotic act, an act that will redound not only to the benefit of the Province of Ontario but to the whole of the Dominion of Canada.

ADDRESS

Rev. Canon Cody, Toronto

I thank you for your cordial and kindly reception. It is a pleasure to be with a gathering of horticulturists. The organization of the various local societies into a Provincial association under government supervision is surely a most admirable arrangement. Nearly all good movements begin among enthusiastic individuals. They form groups of like-minded persons. The fire is caught by another group, and when the movement gains headway it is recognized by an authority that the movement is worth promotion, guidance and support. The kind of movement that combines voluntary effort and government guidance is the best possible method. You know we all, more or less, are afraid that movements beneficent, movements of art, should be standardized and made too rigid. There is always a danger of that when the State alone

controls. There is always a danger, even in our educational system, of becoming unduly rigid. That is inevitable when you handle great bodies of people, as you must, from a central authority. But this organization combines central guidance, central support, central inspiration, with wide-spread local voluntary effort. I congratulate you that your membership has reached 70,000 and I am sure your goal of 100,000 will be reached ere long.

Horticulture is derived from a Latin word that means a garden, and the root of the word "to cultivate," and so horticulture is the science and art of cultivating garden plants, both utilitarian and ornamental or decorative. That I presume is the broad sweep of the work of your association. Garden plants for the purpose of use and for the purpose of decorativeness, are the objects of your quests.

We of British stock come from a race that is noted for its love of gardens and its love of flowers. It has been my lot within recent months to visit England, France and Switzerland and Italy, and on previous occasions to go farther afield in Europe; but one is specially struck by the contrast between the English garden and the trim, rigid, unduly artificial garden in France or Italy. It seems to me that in England the tradition of order and liberty is maintained even in the matter of flowers and gardens. Ordered freedom is the characteristic of the British people, and I have often thought that ordered freedom is expressed in the typical English garden. How wide-spread is the English love of flowers! You go into the lovely countryside of England. It all seems like a park, little houses in the hamlet or the village have their window pots and their trim gardens, all gorgeous with flowers. You go even into the east end of London into the slum districts, and one of the pathetic facts that strikes your eye is the persistent effort made in window pots, to bring into the crowded purviews of the city a little of the countryside. Everybody who cultivates flowers is capable of being a good farmer, and therefore sometimes in dealing with matters of immigration, when you are told you can't get an unbounded supply of people from the farms of England to come to our farms in Canada, I believe that everybody who in England loves flowers and a garden and cultivates them, has in him the root of the matter of the cultivation of the soil and might make good agricultural settlers if trained. I am convinced that is true, and if anybody is bold enough to try the experiment it will prove to be satisfactory from an immigration point of view. We inherit a good tradition, the tradition of love of garden and flowers, Do you remember Kipling once wrote a poem on the garden, and he explained that gardens were not made smooth and clean and flowers beautiful by simply sitting in the shade and saying, "Oh, how beautiful," but only by grubbing up the weeds, and patience and early rising, and constant watering of the plants. You can't be a successful gardener unless you are willing to spend time and thought and pains.

There is one other factor about the work of horticulture that is obvious here to-night, and that is that you can influence growing good flowers, influence them by your love of flowers. I believe that flowers are partly human, there is some kinship between us and these wonderfully beautiful living things: they breathe, they have an influence upon the air about and the environment, and air influences them—they are almost real living things. And you are not going to get the best flowers unless you love flowers, and there is not any more refining factor in regard to character, it seems to me, than the love of flowers, plants and trees. I can't conceive of a lover of flowers being cruel to animals or to any living thing. I believe that the love and the culture of flowers is of real value from the cultural standpoint!

The Minister of Agriculture has rightly referred to the fact that these touches of beauty in our country come naturally and almost inevitably after we have fought the grim battle with the primeval forest and have overcome our pioneer difficulties. That is undoubtedly the case. A great educationist of Greece many centuries ago referred to, and every educationist since has recognized, the fact that there are three great aims in all the development of human beings—there is the aim at truth, the aim at goodness, and equally the aim at beauty. Nobody is thoroughly educated, or indeed fully developed, unless he not only loves the truth, unless he loves and seeks to embody goodness in his person and character, but aims also for some love, even elementary, for beauty. That instinct for the beautiful is an integral part of our human make up. Some do not seem to have that sense for the beautiful highly developed—so far they lack an essential element of humanity; but that love and development of the beautiful, historically, has usually come when we have overcome material difficulties and are beginning to grow a little more prosperous.

Flowers appeal to the instinct of beauty; flowers appeal to beauty of sight and beauty of smell, beauty of form and shape, and the exquisite beauty of touch. Everything that is beautiful, it seems to me, is represented in and through flowers. No wonder people bid you "say it with flowers," whatever message you give with flowers, be it a message of congratulation or a message of sympathy, always carries, I think, that marvellous element or sheaf of beauty. And those who deal with beautiful things do themselves become refined to beauty of soul.

A group of horticulturists, lovers of flowers, is a group of the most admirable and delightful of our citizens. They are high priests and high priestesses of beauty.

I have spoken mainly of the effect of our work upon ourselves, our own characters. As has already been said, there is a wider aspect. How many ugly spots in our countryside and in our cities have been conpletely transformed by the planting of flowers and shrubs and trees. A few years ago when I was Minister of Education, I had the pleasure of visiting the City of St. Thomas, and there I first had brought home to me what could be done by a living horticultural society for the beautification of a whole city. Dr. Bennett, I believe, was the president of the society; he is a red hot enthusiast. Under his inspiring leadership almost every waste space in the city of St. Thomas was made fair and beautiful by the planting of flowers.

In Old England, even in the "black country," the necessary penalty a country has to pay for its industries and the possession of coal, you will find the pathetic effort of the operator or the miner still to grow a few things of beauty, to stand in brilliant relief against the uniformly black background. You can transform a whole countryside and make it a thing of beauty. It is advisable, is it not, that we should in Ontario vindicate our progress by paying more attention to the beautiful side of life? We are making efforts in different parts of our country to cultivate the artistic sense of our people. In the city of Toronto slowly but steadily we are gathering a wonderfully beautiful collection of pictures. We have another marvellous collection of beautiful things, of pottery and furniture and fabric in the Royal Ontario Museum, for which most sorely we need new wings. Everywhere in Ontario, as we have grown more prosperous materially, you are finding the fresh demand for things of beauty. And is not that as it should be? I often think might not the Creator have made this world dull and drab and yet useful? Why all this beauty that is lavished on the world? Surely, apart from any utilitarian purpose it serves, is it not a marvellous extravagance? It seems to me that even in and through nature, there is demonstrated to us

the love of beauty of the Creator. It seems to me one of the endless charms of gardening is that you immediately share with the Creator in His work. Is there anything comparable to making or helping things, living things, to grow? It is a marvellous privilege to help a child grow—one of the highest responsibilities and greatest privileges in the world. It is a privilege to help flowers and plants and trees to grow. We may make with our minds and our hands, and our applied science, so many things out of dead material, but when we touch the living plant there is a beauty there that we can't understand but which we can use and help, and in a sense guide, and we share with the Creator in some fashion in that continuous creation that marks this beautiful world.

Is it for nothing that many of the progressive nations of the world have chosen flowers as their national emblem? Let me begin with little Wales that has chosen the leek, vigorous and strong in its effect, and yet with a measure of fundamental beauty, for green is the natural fundamental colour. You come to Old England, and there you have the rose—perhaps of all flowers the most beautiful because it combines marvellous beauty of colour with unequalled beauty of odour. There are some countries like India where you have marvellously brilliant colours and no smell. A Viceroy of India once said, after he had been presented with some marvellously brilliant and beautiful flowers, "These are the only things in the country that don't smell." But take the rose: Just as the old Mother Country has under the good providence of God stumbled upon the best parts of the world, and these now form integral members of our far-flung Empire, so it seems to me have we stumbled upon the most noble flower of all —the rose. And as you know, historically, the rose played a great part in English history—the red rose was the emblem of the House of Lancaster, the white of the House of York. The Red Rose and the White Rose stand for so much in the history of England—sweetness and beauty, and a kind of fundamental solidarity.

The flower of the thistle is beautiful in its way and place. In Scotland centuries ago a barefooted Dane, creeping by night in invasion upon the sleeping Scots of old, trod on a thistle and uttered a shout! Should not the thistle become the motto of Scotland, the symbol of Scotland, with the motto, "No one touches me with impunity."

And in Ireland the shamrock: may it not be included under the head of horticulture, and the old tradition is that in days long ago when St. Patrick, the Apostle of Ireland, was preaching, he picked up the three-leaved shamrock and used it to illustrate his theological message of the nature of the Trinity.

In France in days gone by there was the fleur-de-lis, on the flag waving from the Citadel of Quebec under the Bourbon regime, and just a few weeks ago on the municipal banners of the Italian city of Florence. The fleur-de-lis is on our British coat-of-arms, and in consequence upon our Canadian coat-of-arms. Think of all the historic association of the fleur-de-lis! The marguerite of Italy! And in these later days we have come to associate the poppy not only with the general idea of sleep but with the idea of all those brave ones whose bodies are resting in some foreign soil that is forever Canadian.

What a message flowers have to give us in the history of the world! One might find in the legend of flowers so many exquisite stories and legends. Flowers naturally come to be symbols of things greater then themselves.

I am glad that there is in this Province of Ontario a series of societies organized into this one great whole, for the purpose of beautifying the locality, and in consequence of beautifying, making more homelike, more lovely, more attractive this Province as a whole. Should not Ontario lead naturally in this

matter. We are the most southerly part of the Dominion of Canada. We have better climatic conditions than any other part of Eastern Canada (our one great rival of course is British Columbia), and why should we not present, as has been said already, to our innumerable American visitors, the side of beauty as well as the side of prosperity and law and order and decency. I am sure that this society will make a real contribution to the higher life of the Province of Ontario, and of the Dominion of Canada. Your example will be catching, and happily, by the providence of God, flowers can grow almost anywhere. Some years ago I had the pleasure of going to James Bay with the Lieutenant Governor, Mr. Cockshutt, Mr. Ferguson, Mr. Lee of the T. & N. O., and others, to see what our ocean seaboard in this Province looked like (and don't forget we have an ocean seaboard), and what struck us at Moose Factory was to find out that every year when the Hudson's Bay boat came out, the great English firm of Sutton's sends out to the missions there a good selection of garden seeds, and in their season, all too short, they plant seeds and they come to maturity. They have long, long days. There is scarcely a place where a flower can't grow. There are very few sections of human life where you can't plant, cherish and develop the flowers of kindness and charity.

Mr. Hanigan proposed a toast to the Toronto Horticultural Society, and asked Mr. Godson to reply.

Mr. Godson named those who had been good enough to donate flowers: Dale Estate, Dunlops Ltd., J. A. Neal, J. J. Higgins; Miller & Sons, Lady Eaton, Sir Jos. Flavelle.

Mr. Godson then touched on the subject close to his heart, namely, the Bowmanville school for boys and of the arboretum which was to be established there.

A basket of roses was presented to the Minister of Agriculture.

List of officers and representatives elected appears on page 4.

The Treasurer's Report, presented by Mr. Hesson, appears on page 4.

It was moved by Mr. Hesson, seconded by Mr. Carter, that the Treasurer's Report be adopted. Carried.

REPORT OF THE HORTICULTURAL COUNCIL

J. E. Carter, Guelph

I beg to report as follows some of the activities during the past year.

"Appointment of Advisory Board." Arrangements have been made for the formation of a Horticultural Section of the Canadian Society of Technical Agriculturists which will act in an advisory capacity on technical horticultural matters.

"Consolidation of Provincial Horticultural Societies." An endeavour has been made throughout the year to encourage the formation of Provincial Horticultural Societies in those provinces where local societies are sufficiently numerous. Some progress has been made and it is expected that during 1927 we will have Provincial Horticultural Societies in at least two more provinces.

Plant Registration

The Plant Registration Bureau of the Council has continued to operate in a most satisfactory manner and the protection which it affords to plant

breeders is apparently much appreciated. A number of new varieties of various kinds of horticultural plants were recorded with the council during 1926, and a number of these are now under test at the various official trial gardens, with a view to determining their merit preliminary to registration. A number of these previously recorded were, after test, found to have outstanding merit and were registered.

By recording a variety no statement is made or implied in any manner whatever concerning the merit of the new plant. It is simply an acknowledgement of the most expert horticultural opinion available that the variety is new and the ownership of it hereby established.

Before a variety can be *registered* it must first be tested to the satisfaction of the registration committee, at the various trial gardens provided for this purpose, and found to be of outstanding merit.

Both the Dominion and Provincial Departments of Agriculture have co-operated to the fullest possible extent and the official trial grounds of the council, where new varieties are tested, are at the various agricultural colleges and experimental farms throughout Canada.

When it was put into operation, it was expected that possibly the whole system or at least a number of the regulations might prove impraticable and would accordingly require amendment and adjustment. During the several years of operation, numerous suggestions have been received as to how the plant registration system could be made more practical and valuable, and in order to consider these suggestions a Plant Registration Conference was called by the Council in Ottawa on June 24th last. The recommendations of the Conference were as follows:

> "Resolved that the Plant Registration Committee adhere to the present system followed in the recording (with the exception of the issuance of the certificate of record) and registration of plants, but that an award of merit certificate may be issued by the Council on the recommendation of any recognized horticultural organization for plants accepted for recording by the Council, the Council, however, to assume no responsibilitity for the merit of the plant.

In view of the recommendations of the conference—

1. No certificate of record will be issued.

2. Upon the recommendation of any recognized horticultural organization the Council will grant an award of merit certificate for any plant recorded with the Plant Registration Bureau.

3. The fact of the award of this certificate will be taken into consideration, together with the records of the test, when determining the merits of a plant, with a view to registration.

Demonstration Gardens.—Demonstration gardens, where a comparison is made between varieties of horticultural plants and different stock of the same variety, in order that all who visit the garden may see the relative merits of plants growing there from different sources, have been established under the aegis of the Council at numerous points.

The best varieties for the district are here seen by a large number of persons, and it is thus an excellent means of bringing about a rapid improvement in the quality of the varieties grown.

Carter Medal.—The Carter Medal is awarded each year by the Council to the person who, in the opinion of the Council, has done most for the advancement of horticulture in Canada.

In accordance with the decision made at the Council's last annual meeting the medal was presented to Mr. H. J. Moore, Islington, Ont., at the annual meeting of the Canadian Florists' and Gardeners' Association in London, Ont.

C.F.G.A. MEDAL.—*Through the kindness of the Canadian Florists' and* Gardeners' Association a very beautiful gold medal has been made available for annual award by the Plant Registration Committee of the Council for the best origination of a florist plant or flowers recorded during the year by the Plant Registration Committee. The medal for 1925 was awarded to Mr. R. Hemstock, Whitby, Ontario, as a reward for his personal work in the origination of the Gladiolus "Miss Freda."

DIPLOMAS AND AWARDS OF MERIT CERTIFICATES.—In order to encourage a greater interest in horticultural exhibitions and displays, the Council has available diplomas and award of merit certificates, the former for the best display of horticultural products at a recognized exhibition or horticultural show and the latter for new varieties of outstanding merit exhibited at such a show.

The growing demand for these certificates, which are furnished free, is indicative of the value which is placed upon them by exhibition committees.

RURAL SCHOOL COMPETITION.—The Dominion wide competition to encourage the beautification of rural school grounds, instituted by the Council, was whole-heartedly accepted by the rural schools and numerous entries were received.

The major object of the competition is, by working through the school children, to stimulate the horticultural development of rural Canada and bring into line with the high horticultural standards of our urban centres.

For this purpose, the Dominion was divided into eleven districts and a valuable silver trophy cup provided for each to be awarded by the district committee to the rural school showing the greatest improvement in its school grounds during the season. To become the permanent possession of a school, the cup must be won three times, not necessarily in succession.

Many schools in addition to those awarded cups were highly commended and awarded diplomas for the splendid improvements made in their school grounds during the past season.

Many inquiries for information concerning the competition are already being received for next year's contest.

PUBLICITY.—The circulars issued were well received.

STANDARD SCORE CARDS.—After consulting authorities in the various provinces, Professor T. G. Banting, chairman of the Standard Score Card Committee, recommended the approval of score cards to be used in the judging of fruits, vegetables, flowers and gardens. The recommendation score cards were printed in booklet form and some 2000 copies distributed. There is no doubt that the general adoption of a uniform score card throughout the Dominion will be to the very great advantage of exhibitors.

LIST OF SCHOOLS AWARDED THE SILVER TROPHY CUP IN THE PROVINCE OF ONTARIO, 1926.

EASTERN DISTRICT.—(Donated by E. D. Smith & Son, Ltd., Winona). School Section No. 2, Reach County, Manchester, Ontario.

WESTERN DISTRICT.—(Donated by Messrs. Stone & Wellington, Toronto). School Section No. 1, Mersea, Essex County, Wheatley, Ontario.

NORTHERN DISTRICT.—(Donated by W. A. Fraser, Trenton). Elma School Section No. 2, R.R. No. 2, Listowel, Ontario.

PLANTS REGISTERED DURING THE YEAR OF INTEREST TO THIS ASSOCIATION.

Kind of Plant	Name	Name of Declarer
Lillium	George C. Creelman	Ontario Agricultural College, Guelph.
Chrysanthemum	J. R. Booth	Central Experimental Farm, Ottawa.
Rose	Agnes	Central Experimental Farm, Ottawa.
Gladiolus	Lady Byng	A. Gilchrist, Islington, Ont.
Chrysanthemum	H. P. Buell	W. J. Smith, Rougemont, Quebec.
Fern	Lady Atholstan	Chas. A. Smith, Lachine, Quebec.
Tulip	Dean Clement	University of B.C., Vancouver, B.C.
Begonia	Francis Williams	Francis Williams, 396 Willibrord Ave., Verdun, P.Q.

The Canadian Horticultural Council took up the question of revising the tariff on horticultural products, but as it was impossible for your representative to secure your views until this meeting, it was impossible for me to act.

GRADING OF BULBS.—I have been advised that the Manitoba Horticultural and Forestry Association intend placing before the Council at the coming annual meeting a resolution adopted at its annual meeting concerning the grading of bulbs and possibly other nursery stock. It is pointed out that importers purchase bulbs on grade but there being no law in the Dominion to do so, they do not sell on grade. Compulsory grading has been found to be of very considerable advantage for other lines of agricultural products, and I should appreciate an opinion of the members of this association on this matter.

CANADIAN GROWN NURSERY STOCK

C. K. BAILLIE, Hamilton

Some years ago at a Convention held by this Association, I listened to a most interesting paper delivered by one of your members and words along these lines formed part of the address: "The man in the field working to develop production and intensify beauty is doing work that is absolutely essential to the welfare and prosperity of Canadian home life and his occupation which is both an Art and a Science, should receive just recognition." This description might well fit the trained nurseryman. Representing as I do a body of Canadian nurserymen, I propose to outline to this meeting some important features and some arguments which I think entitle Canadian nurserymen to consideration when your societies tackle next spring the question of nursery stock purchase. When I was selected to prepare an address I felt, as secretary of the Eastern Canada Nurserymen's Association, that I should obtain the views of several members on this important subject, and I have tried to amalgamate these with my own observations and ideas. We Canadian nurserymen have during the last 10 or 15 years made big strides in the growing of increased varieties of all kinds of stock. Professional landscape gardeners practicing in Canada have encouraged to a certain extent the growing of varieties for which there was previously little or any demand at all. So I have checked up very

carefully the lists of three only of the largest Ontario nurseries and I find that, without duplication, the following varieties are available in Canadian grown stock and can be furnished in the spring or fall of the year at a moment's notice.

117	varieties of	Apples.	20	varieties of	Grapes.
12	"	Crabs.	13	"	Red Raspberries.
23	"	Stand. Pears.	6	"	*Black Raspberries.*
52	"	Plums.	6	"	Blackberries.
40	"	Cherries.	15	"	Currants.
29	"	Peaches.	7	"	Gooseberries.
4	"	Quince.	5	"	Asparagus.
6	"	Apricots.	5	"	Rhubarb.

116 varieties of ornamental trees including the following:

12	varieties of	Maples.	7	varities of	Magnolias.
3	"	Horse Chestnut.	6	"	Crabs.
8	"	Birch.	9	"	Poplars.
6	"	Thorns.	6	"	Oaks.
4	"	Beech.	6	"	Willows.
			6	"	Elms.

229	varieties of	Shrubs.	19	varieties of	Spireas.
8	"	Cornus (Dogwood).	45	"	Lilacs.
10	"	Deutzias.	28	"	Altheas.
10	"	Lonicera.	9	"	Viburnums.
18	"	Philadelphus.	12	"	Weigelas.

30	varieties of	Climbing Vines.
310	"	Roses.
111	"	Evergreens in sizes from 12 inches to 5 feet.
1014	"	Perennial plants including the following:
27	"	Asters.
18	"	Campanula.
33	"	Delphinium.
23	"	Dianthus.
133	"	Iris.
102	"	Paeonies.
15	"	Poppies.
97	"	Phlox.

It seems to me that in this extensive list there is practically everything that a Horticultural Society would need for home, park or street beautification and all stock that can be moved to the garden from the nursery row with the minimum of delay.

May I briefly state some arguments in favour of buying these Canadian trees and shrubs produced in Canada.

(1) *The stock grown here in Ontario is hardier than foreign or imported stock.* It is acclimated, is more suitable for Canadian orchards and gardens and far more likely to thrive and succeed than any imported stock, and therefore being better it is in the end the cheaper. The hardiness of varieties has been tested over a number of years, whereas many kinds imported into this country have no chance.

(2) It can be moved from the nursery to its new location with the minimum delay. Stock generally is freshly dug on the nurseries, packed under cover and handled in a manner to prevent all possible exposure to wind and sun. To be able to handle early spring orders some stock is dug in the fall of the year, and most large Canadian firms have erected storage cellars at considerable expense to take care of such stock during the winter months and in a way that will insure the trees coming out in the spring in the same conditions as they would if dug in the spring. Stock coming over the ocean is stored away in the hold of vessels without regard to its susceptibility to cold and heat and arrives in a dried up or moulded condition.

(3) Our Provincial Government Inspection is very thorough and invariably stock leaves the nurseries absolutely free from disease. All kinds of injurious pests and diseases have been brought to this continent through incoming stock. Our fruit and vegetable crops suffer immense losses every year, and it has been estimated by competent authorities that damage to crops arising from insect pests and diseases in Canada amounts to fully $100,000,000 annually, and added to this we have to remember the further huge losses which are caused every year to forest and shade trees. For instance Government officials have estimated that one insect alone, the Spruce Budworm, has during the last 10 or 15 years, destroyed huge plantations of balsam and spruce, such losses in Eastern Canada amounting to millions of dollars. The United States Department of Agriculture realizing the increasing danger of these foreign pests, some years ago placed an absolute embargo on all incoming nursery stock, so that it is now impossible for Holland, France, England or any other country to export into the States. The purchase of Canadian grown trees and plants, particularly those grown in the Niagara district (an immense orchard section where inspection is as efficient and as thorough as inspection done anywhere in the world), will not only mean better assurance of the purchaser's orchard or garden being free of injurious pests and plant diseases, but will be a collaboration with Federal and Provincial Governments and an individual contribution to the necessary and important effort to keep out the insect and plant diseases which in every known case have, I think, come into the country on importations. May I mention in further connection with Provincial Inspection that Ontario nurserymen have during the last twelve seasons adopted inspection under the Leaf Identification Scheme sponsored by the Provincial Government. Under this scheme commercial varieties of fruits are inspected and certified by qualified inspectors, so that fruit growers may be assured of receiving trees that have complied with the regulations instituted by the Department.

(4) Stock can be ordered and delivered on shortest notice and the worry and trouble of customs clearance, etc., is avoided. Imported stock is always held up at port of entry for inspection, and invariably held over on account of irregularities in invoices or noncompliance by the exporter with Customs regulations.

(5) Shrubs and evergreens are grown on native soil and in many cases are root pruned, thus giving a fibrous root system that is not generally obtainable in foreign stock.

(6) A customer dealing with a reliable Canadian firm will obtain full value for his money. In the event of error any such firm established in Canada will immediately make adjustment, whereas the customer invariably has no redress if he is dealing with a concern outside his own country. Then again most nursery firms are making a feature of their service departments. Some firms have engaged competent landscape men who give advise on the proper development of gardens and grounds and advice also on the selection of the best and hardiest varieties for different localities. Other nurserymen through their close touch with the fruit industry make a feature of giving most valuable advice to those engaged in fruit culture and who may be at a loss to know what kinds of fruits to plant for the particular market he expects to cater to in the future whether it be a local, Eastern or Western market.

(7) Consideration should be given to the fact that the majority of Canadian nurserymen quote a "cover-all" price. By this I mean they pack free, pay freight or express, and replace dead stock the first year at half price. These should always be taken into account when comparing prices not only of Canadian

lists with foreign lists but Canadian lists with Canadian lists as very often there is a great discrepancy in quotations which can generally be traced to these extra costs. I think I may safely say without fear of contradiction, that the majority of stock purchased by the various Horticultural Societies finds its way into this country from Holland or France—mainly from Holland, and our Horticultural Societies, while being a benefit to the Canadian public may unconsciously be a detriment. If they take from the public treasury in the form of grants, and from their own patrons good Canadian money earned by reason of their own firm and excellent faith in Canadian enterprise and expend it so that it circulates again and again into the pockets of Canadian labour then they are doing this country a genuine service, but if by reason of a reduction in price of an article produced at low labour cost, they buy from a foreign country goods that are and can be produced in Canada and give these exporters the fruits of Canadian labour, then we are not doing our country or our province a service.

Canadian grown nursery stock consists almost exclusively of Canadian labour. When a Canadian grown tree is sold wholesale at, say $1.00 in Canada, quite 80c consists of labour which costs at least two and one half times as much as labour costs in Holland, or in other words, what has cost the Canadian nurserymen 80c costs the Hollander 32c, and on the same basis of 80% labour could be wholesaled by the Hollander at 40c. The duty is 15%, making a total cost of 46c plus freight against our wholesale selling of $1.00. So it is quite apparent, I am sure, that if you members of the Horticultural Association can devise some means of giving us labour at a price prevailing in Holland, we can undoubtedly furnish you the goods at Holland prices. There is no doubt whatever that a Rose bush grown in Canada and close to our own markets is a far better article than one grown in the lush black soil of low lying Holland, and is very much more likely to grow, live and thrive than one of the soft Holland bushes, but price counts and jobbers load up with this cheap stock, and I understand that more than one million of them came into our country last year.

We have sufficient dependable nurseries in Canada to produce all our requirements, so that lower prices will undoubtedly result when we can sell to full production, and I am sure it is the wish of all of us to build up horticulturally as well as nationally a Canadian sentiment from ocean to ocean.

It is hoped that these few thoughts on nursery stock dealing with hardiness, sturdiness and freedom from disease may be given proper consideration by your members, and that through the superiority of our home grown stock, we may secure our fair share of this association's patronage which has been lost to us in the past.

THE INSPECTION OF NURSERY STOCK

Arthur Gibson, Dominion Entomologist, Ottawa

The Entomological Branch of the Dominion Department of Agriculture is concerned, as you know, with the protection, either by prevention or otherwise, of plants from insect enemies. During the Great War the Branch adopted the slogan: "Crop Protection means Crop Production." We have organized our forces along definite divisional lines, and in addition to the executive and research officers stationed at Ottawa, have established field laboratories in the various provinces at each of which trained entomologists are employed to study insect problems of special concern within their respective territory. The divisions so

far organized, in addition to my own Administrative Division, are the Division of Field Crop and Garden Insects, the Division of Forest Insects, the Division of Foreign Pests Suppression, and the Division of Systematic Entomology. Other special investigations which are being brought together are Fruit Insects, Stored Product Insects, Greenhouse Insects, Household Insects, Live Stock Insects and Insecticides.

It is, however, the work of the Division of Foreign Pests Suppression, that my associate, Mr. McLaine, and I are to specially discuss to-day. This division is directly concerned with matters relating to the administration of the regulations of the Destructive Insect and Pest Act.

The inspection of nursery stock is an important part of our work. When the Act referred to was passed by Parliament in 1910, and in fact for two years previous to that, I personally was much engaged in such inspection work, owing to the finding of nests containing living caterpillars of the dreaded brown-tail moth in shipments of nursery stock imported from Europe. This necessitated my visiting practically every nursery stock importer in the provinces of Ontario and Quebec. In this way, I think I was successful in developing among importers an appreciation of the importance of such work, which appreciation I am glad to state has developed steadily and is to-day stronger than ever. I would not like to think what might be the present state of many of our nurseries in Ontario if our officers had not discovered, in their inspection work, the many nests of the brown-tail moth shipped to Canada with certain classes of nursery stock. As a normal nest of this moth may contain as many as 400 hibernating caterpillars, it is not difficult to conceive how an infestation could be started providing an inspector overlooked a nest and this in some way found its way outside. Fortunately this did not happen and it is only right, therefore, to acknowledge in this connection the value of such inspection work. Every country in the world which is developing an entomological service is concerned with plant inspection work. As I stated recently in an address delivered before another association, "it is to be regretted that destructive forms of insects take on the bad habit of spreading and thus are no respecters of human property, even that of a neighbouring nation." Situated as are Canada and the United States, it is difficult if not impossible, to prevent the natural spread of a destructive insect, but in the inspection of nursery stock imported into Canada, it is possible to intercept insects of various kinds, some at least of which if introduced would undoubtedly develop and sooner or later be responsible for serious losses. Fortunately for such inspection work many forms of destructive insects have the natural habit of hibernating on the plants, and the inspector with his eyes trained for such work readily detects the enemy.

Canada loses every year as a result of the ravages of injurious insects, crops and plant products worth many hundreds of thousands of dollars. In addressing one of our service clubs recently, I stated this in the following words: "The wheat crop of Canada in 1925 was 422,327,000 bushels, the oat crop 514,827,000 bushels, other cereals 183,013,000 bushels. In the growing of these crops, the farmers of Canada supplied food to destructive insects to the value of $90,000,000. Huge losses also occurred to our fruit trees, our vegetable crops, produce of many kinds kept in store, clothing and so on, all of which goes to show that insects annually destroy in Canada crops to the value of over $100,000,000, and added to this, we have to realize the further huge losses which are caused every year to forest and shade trees. One insect alone—the spruce budworm—has during the last 10 or 15 years destroyed large stands of balsam and spruce trees, such losses in eastern Canada amounting to millions and millions of dollars."

Insects introduced into a new country where conditions such as temperature, humidity, plant growth, or other environment factor, are different, and when too they have not been accompanied by natural parasitic or other enemies, very often find that in the new habitat every facility is present to enable them to develop rapidly, take on new feeding habits and attack nursery or other plants upon which in their native country they are not a pest of any importance. It is for this reason that our inspectors are constantly on the lookout for any forms of insects present on importations of plants or plant products from foreign countries. Since our branch of the Department has been charged with administering the regulations of the Destructive Insect and Pest Act, in so far as insects are concerned, it is a pleasure to state that no pest of importance has gained a foothold in Canada through importations of nursery stock. In this inspection work, our inspectors have frequently intercepted dangerous insect enemies particularly on plants imported from Europe. In addition to the Brown-tail Moth, the following important pests have been found: Gypsy Moth, the Apple and Cherry Ermine Moths, European Pine Shoot Moth, Azalea Leafminer, various scale insects, etc.

The work of the Division of Foreign Pests Suppression may, in brief, be compared to that of a police system which is maintained to preserve law and order. Without such system, crime would be prevalent and the country as a whole disorganized. In the absence of our plant inspection service, pests such as the above would undoubtedly become established and the country as a whole put to great expense for their control.

My colleague, Mr. McLaine, will discuss particularly the requirements under the regulations of our Act, as well as other matters dealing more directly with the actual inspection of nursery stock.

I am personally interested in insects which attack flowering plants whether in the greenhouse or in the garden. We published in 1922 a 63 page illustrated bulletin on Insects Affecting Greenhouse Plants, and now have in preparation what we hope will develop into a somewhat similar publication, namely, one on "Insects of the Flower Garden and Their Control." During the coming summer, I would welcome correspondence from any of your members relating to any forms of insects which may be causing injury to flowering plants.

DISCUSSION ON THE REGULATIONS DEALING WITH THE IMPORTATION OF PLANTS

L. S. McLaine, Department of Agriculture, Ottawa

The Destructive Insect and Pest Act Advisory Board was constituted in 1922 for the purpose of recommending to the Department of Agriculture such changes in the regulations under the Destructive Insect and Pest Act as may be considered necessary. This board functions in an advisory capacity with one exception, that is the secretary is empowered to issue permits to cover the importation of plants. The administration of the various regulations under the said Act is carried out by the various divisions concerned.

The question of why permits are necessary for importations of plants is frequently raised. The two most important reasons for this requirement are: first, in order to prevent the importation of plants which are prohibited from entry on account of specific pests or diseases; and second, to assist the Department of Customs in the enforcement of the regulations. With regard to the first point it should be mentioned that if a permit is refused for plants which are

prohibited from entry, the importer is saved the cost of the plants which would have to be seized on arrival in Canada, as well as the transportation charges on a shipment which the law would prevent him from clearing from Customs. It may be a matter of interest to note that for the year ending March 31st, 1926, a total of 13,730 permits were issued to 6,354 different consignees.

The regulations dealing with the importation of plants are divided into fifteen foreign and seven domestic quarantines or embargoes, each one of which deals with a separate subject. Regulations numbers one and two foreign, concerning the importation of plants from the United States, and from countries other than the United States will undoubtedly be of more interest to this audience than the others.

Before bringing in plants from the United States, the importer is required to secure a permit which must be presented to the Customs at the port of clearance before delivery of the shipment can be secured. The shipper is required to furnish a certificate of inspection as well as a certificate of fumigation (unless the plants are exempt from treatment) covering the consignment, and forward these to the importer to present with his permit to the Customs. The following types of plants are exempt from fumigation: greenhouse plants, herbaceous perennials, herbaceous bedding plants, strawberry plants, blackberries, raspberries, loganberries, grapevines, bulbs, tubers, dahlias, corms, rhizomes, conifers, and scions when imported via mail and reinspected either at Montreal or Vancouver. Shipments of nursery stock from the United States consigned to points in Canada, other than in the province of British Columbia, may enter through any port of entry at any season of the year.

In regard to shipments from countries other than the United States the requirements are slightly different. The importer is required to secure a permit as mentioned in the previous regulation. When the permit is secured the number of the same should be sent to the shipper, who is required to place it on the container together with a copy of the certificate of inspection, and a label showing the names and addresses of the consignor and consignee, and the quantity and kind of stock contained therein. The original certificate of inspection must be sent with the invoice to the importer in Canada, the latter should present these to the Customs together with his permit at the time the shipment is cleared. Nursery stock from countries other than the United States may enter Canada at any season of the year, but only through one of the following ports: St. John, N.B.; Montreal, Que.; Niagara Falls, Ont.; or Vancouver, B.C. On arrival at one of the said ports the stock is either inspected or permitted to proceed to destination for examination.

Provision is also made for the forwarding of small shipments of plants by parcel post. When an importer applies for a permit he is furnished with an official mailing label, which should be forwarded to the shipper and the latter affixes it to the packages. This ensures the package being inspected at either Montreal or Vancouver. After examination, the packet is reforwarded in bond, without the payment of additional postage to the consignee at ultimate destination.

During the past year 5,555 separate inspections were made by officers of this service, this entailed the examination of 22,466 packages containing 30,463,699 plants. In 199 different shipments pests and diseases of one kind or another were intercepted.

Plants prohibited entry for specific pests or diseases were intercepted 128 different times, among these were included 13,490 plants and 19 shipments of potatoes.

In addition to the inspection of ,plants, plant products arriving from all parts of the world are examined for pests and diseases, in so far as the time of the staff will permit. Last year, 5,692 inspections were made of 1,049,833 packages of commodities of all kinds; in eighty-three shipments pests were found.

The service is also engaged in co-operating with the Customs officers in the examination of passengers' baggage on incoming ocean liners. Three hundred and eighteen boats were attended at St. John, Quebec, and Montreal, on 116 of these plants were being brought in by 208 passengers.

Before closing this talk, a word or two should be said with regard to complaints. In the handling of such perishable commodities as living plants, there are bound to be complaints from time to time; very fortunately these are on the whole infrequent and usually of not a very serious nature. But if any importer has any enquiry or suggestion to make, it is of great importance that the complaint should be made immediately, in order that the investigation may be instituted while the matter is fresh in the minds of all concerned. When one considers that each package is handled by the shipper, the transportation company, the Customs, and inspectors of this Department before it reaches the consignee, the importance of this point can be readily understood.

The success of an undertaking of this nature depends largely upon the assistance and co-operation of all those participating—the importer, shipper, transportation companies, Customs brokers and officers of the Federal government. For any one to neglect his part means delay and possible injury to the plants, which every one is anxious to have arrive in good condition. It is indeed gratifying to state that the spirit of co-operation and willingness to assist is evident on all sides and such being the case, it is to be hoped that this protective service may operate more and more successfully for the benefit of the lover of flowers and horticulturists in general.

THE DISEASES OF THE GLADIOLUS

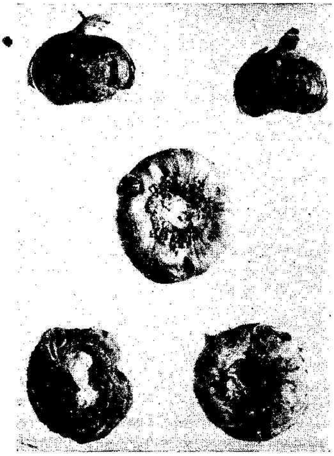
F. L. Drayton, Plant Pathologist, Ottawa.

During the past ten years there has been a marked annual increase in the popularity of the gladiolus, particularly as a cut flower. This has been accompanied by the development of the commercial cultivation of this plant in Canada. It is estimated that over 300 acres were devoted to this purpose in 1926, the largest proportion being in the province of Ontario.

In the spring of 1926, several large shipments of gladiolus corms from various countries were refused entry into Canada because of the high percentage of diseased corms found in them. In one instance, the firm to which one of these shipments was consigned, attempted to replace these corms with Ontario-grown stock. They complained to the Department of Agriculture that the corms supplied by the Ontario grower contained a larger percentage of disease than there had been in the shipment which had been refused entry. This statement was substantiated by the specimens they submitted. It was obvious, therefore, that in our attempt to protect the purchaser from the receipt of diseased corms by inspections of shipments from other countries, we were not going far enough, it being necessary also to do some educational work among our growers.

In the late summer of 1926, many commercial gladiolus growers in Ontario were visited. A survey was made of the amount of disease present in these plantations, so that some future policy in relation to this industry could be formulated. In addition an apportunity was afforded to acquaint the growers of the appearance of these diseases in the field, and to suggest a procedure whereby clean stock could be grown.

Any plant grown commercially, especially on limited areas of land which do not permit of long rotations, invariably becomes affected with diseases of more or less importance. This is true of the gladiolus, even although it is comparatively easy to grow and well adapted to gardens of small size.



Corms with disease known as scab.

After having grown gladioli in my garden for some years, it became evident that certain diseases were gradually becoming established. On consulting the literature on this subject, it was found that little work had been done along these lines, and in 1924 a study of these diseases, both in the laboratory and in the field, was included in my duties as plant pathologist.

In this article the symptoms of the three diseases, dry rot, hard rot, and scab, will be described, and in conclusion, recommendations, based on our present knowledge, will be made for the elimination of these troubles.

Dry Rot

This disease has been found in a number of plantations in Canada, also in shipments of corms from foreign countries, which have been intercepted at the ports of entry. In field experiments conducted at the Central Experimental Farm, Ottawa, during the years 1924 to 1926, it was found that dry rot is capable

of causing severe loss, many varieties being 100 per cent. infected, when grown in soil artificially inoculated with the causal fungus, and soil in which diseased plants had grown the previous season. The name of this fungus has not been definitely established, because of the apparent absence of spores or fruiting bodies, by means of which fungi are classified. It has been tentatively placed in the genus *Sclerotium*.

On the Growing Plant.—No spotting is found on the leaves of diseased plants. Plants which ultimately become diseased grow quite normally for six to eight weeks, then the leaves of plants in groups in rows turn yellow and later become brown and dry. At this stage the stem bends, decays at the surface of the soil, and numerous minute black dots (sclerotia) are found on the leaf sheaths at and below the ground level. In plants which become diseased late in the season these symptoms do not progress beyond the yellowing of the leaves. On removal of a diseased plant from the soil it is at once seen that the old corm is almost completely decayed; the new corm is small, its covering scales are dark in colour or spotted, the roots are poorly developed and more or less decayed; cormel development is poor or absent, and the large fleshy roots which normally develop at the base of the new corm in healthy plants are either poorly developed or absent.

On Harvested Corms and Cormels.—On removing the scales from diseased corms, the surface is seen to have more or less numerous spots or lesions. These areas are sunken, reddish brown to black, dry and punky, more or less circular with definite and slightly elevated margin, and varying in size from a pin point to half an inch in diameter. In mild infections, these lesions usually occur in the lower half of the corm.

In storage the disease is progressive, and a large proportion of the diseased corms become mummied by spring, especially if the temperature is not kept down to forty to forty-five degrees Fahrenheit, which temperature gives the best results for the storage of corms.

Cormels are occasionally found on diseased plants. When first dug, they are smaller and darker in colour than those from healthy plants of the same variety. On removing the shells from cormels borne on diseased plants, about fifty per cent. will show lesions similar to those found on the corms. In a mixed lot of cormels from diseased and healthy plants, after being in storage for some weeks, it is practically impossible to distinguish them. This is a point of great importance, for the diseased cormels when planted become a source of infection.

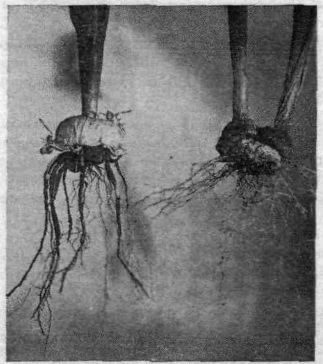
The fungus causing this disease lives over for a number of years in the soil in which diseased plants have grown, and also in the diseased corms and cormels in storage. These, when planted, become a source of infection of the soil and surrounding plants.

Hard Rot

This disease also is caused by a fungus, which has been named *Septoria Gladioli* Pass. It has been found in Ontario, and in New York State is reported to be the cause of the large proportion of the loss from the decay of corms and the premature death of plants.

On the leaves in July and August, the disease appears first as minute brown or purplish brown discoloured areas more or less circular in outline; later the colour of these spots deepens to a reddish brown or black. In the older spots a well differentiated centre, light grey in colour with numerous minute black bodies, becomes evident. The spots are visible on both sides of the leaves.

In the fall, spots appear on the corms, which are at first water-soaked and of a reddish brown to brownish black colour, usually on the sides and lower half of the corms, but not infrequently on the upper half as well. To see these, the corm scales usually have to be removed but frequently spots on the scales are indicative of the presence of a lesion on the corm below. Later in the season, the spots increase in size, the centre becomes sunken, the colour deepens to a distinct black, and the margin becomes more definite. The tissue becomes hard, in some cases extremely so, making it difficult to cut it with a sharp knife. Frequently the disease advances so far that the corm is reduced to a hard shrivelled and wrinkled mummy. The lesion does not extend far into the corm, and is cut off from the healthy tissue below by a layer of cork cells, so that the lesion can be chipped out with the finger nail.



Healthy plant and one affected with dry rot.

The plants in the field are more or less dwarfed, often fail to produce bloom. and die prematurely.

The fungus, as in the case of dry rot, lives over in the soil and in diseased corms.

Scab or Neck Rot

This disease is caused by the bacterial organism *Bacterium marginatum* L. McC.

It probably occurs to some extent wherever gladioli are grown; and while in certain localities it is of little importance, losses have been considerable where conditions are more favourable for the parasite.

The first visible signs of the disease are tiny specks of bright reddish brown colour, slightly elevated and usually in considerable numbers on the leaves, more especially on the basal portion of the leaf sheaths. The spots enlarge, becoming definite lesions with the center sunken, dark brown or black, and the margin slightly elevated. The veins of the leaf sheaths are not attacked and stand out

prominently in the sunken areas. The spots look like burned places, the margins resembling charcoal. In moist weather a general decay of the leaf sheaths takes place from the inside outwards, differing in this way from dry rot in which the decay progresses from the outside inwards.

Infection is most general from the ground level to six or eight inches above. Under certain conditions the outer leaves show little signs of rot, but on pulling the leaves apart considerable soft rotting may be found beneath. The upper portion of the leaves ultimately becomes brown and dry and in the case of severe infection the whole plant falls over. These symptoms are more pronounced on old plants than on young ones.

The corms from affected plants are not always diseased, but often show definite lesions on the corm and corm scales. The infection may be so slight as to escape notice, or so severe as to destroy the scales, and the corm covered with sunken spots.

On the corm scales the disease is evident by brown patches or streaks, later the colour becomes black, the scale splits and rots at the point of attachment to the corm, leaving a ragged margin of the texture and colour of burned tissue. In most cases these spots on the scales are accompanied by a lesion on the corm below the spot. The corm lesion is a shallow depression surrounded by a definite and somewhat elevated margin. The lesions may occur singly or may run together, forming irregular sunken areas. These lesions do not extend deeply into the flesh of the corm, and are easily removed, leaving a clean, saucer shaped cavity lined by healthy cells. The corm lesions have a copious gummy exudate, which when dry is brittle and shiny like varnish. This substance often glues the scales together and to the corm, and also a mass of soil is often found glued to the corm by this material.

The disease has been observed on practically all the varieties commonly grown by florists. The organisms causing this disease live over from one season to another on diseased corms and in soil in which diseased plants have grown.

Recommendations for the Control of Gladiolus Diseases

1. Most of the organisms causing gladiolus diseases not only live over in the soil which has borne a diseased crop, but will continue to live there for a number of years, even if gladioli are not replanted in the intervening years. It is obvious then that these areas must not only be avoided for the future planting of gladioli for at least five years, but every precaution must be taken to prevent the transference of this soil to clean areas, either by cultivating tools, ploughing machinery, by the feet of men or animals, or by wind, in the case of a soil that is liable to drift.

2. Corms having lesions should under no circumstances be planted or sold, because this constitutes the most prominent means of introducing the causal organisms into a soil which may be free from them. In order to make sure that the corms are free from lesions it is necessary to remove the corm scales completely. This can be done either just before planting, or during March and April, provided that the corms from which the scales have been removed are stored until planting time with layers of some such material as peat moss between them in the containers, and kept as near as possible to the ideal storage temperature of 40° to 45° F. If this is not done the corms which have had the scales removed will shrivel.

This recommendation is open to criticism. It would entail a great deal of work in the case of a large grower, but I must strongly recommend this tedious procedure, especially in the case of newly purchased or valuable varieties. Where gladiolus culture is carried on extensively, the work of peeling all corms would render it almost prohibitive. Field experience, however, enables me to make further suggestions that might assist where scaling is not practicable.

3. During the growing season, when cultivation or flower cutting is being done, a sharp lookout should be kept for all plants showing the first symptoms of disease, i.e., a leaf yellowing or spotting. When such a plant or group of plants is found, they and the surrounding soil should be immediately removed with a spade, placed in a box or wheelbarrow kept at the end of the rows, and disposed of in such a way as to preclude all possibility of contaminating clean soil. With the exception of an occasional drying of the leaf tips in hot weather, any deviation from the normal green colour of the leaves, in a climate similar to that of Ottawa at any rate, should be regarded as an indication of the presence of disease, and dealt with accordingly. Even the first two or three frosts in the fall have no appreciable effect on the leaves.

Early ripening of the plants may occur in certain varieties in locations where planting is done early and dry weather prevails in the latter part of the season. Care must be taken to ascertain, however, that the early ripening is not due to disease, and can only be a normal condition when it is uniform throughout the variety and in the absence of any of the disease symptoms described above.

4. At digging time a further opportunity is offered to get rid of diseased plants and their cormels. Any plants which, on being dug, show any signs of decay on the stems or discolouration of the corm scales, should be placed in a separate container and suitably disposed of. While diseased corms may be later distinguished, it is impossible, as I have indicated previously, to separate the respective cormels of healthy and diseased plants, although the latter are capable of carrying the fungus and infecting soil when planted. The two recommendations last given offer an easy way of avoiding this source of contamination, which is one of great importance, and one which if overlooked, will result in a spread of the disease, however careful the inspection of corms and quarantine of diseased soil may be.

5. When cleaning the corms in the winter, another opportunity is afforded to eliminate diseased specimens. The lesions are usually seen in the lower half of the corm, and if not, discolourations of the corm scales with corresponding lesions below will be seen. The corm so affected should be discarded.

6. The use of various disinfectants for treating diseased corms and diseased soil has been tried without success so far. I should, however, recommend the use of a five per cent. solution of formalin for 30 minutes, or a 1 in 1,000 solution of corrosive sublimate for 15 to 20 minutes in the two following cases:

(*a*) For soaking healthy corms selected from a mixture of healthy and diseased ones.

(*b*) For soaking corms of expensive varieties after the lesions have been cut out with a knife.

7. The inspectors at the ports of entry are now familiar with these diseases and a more careful search is being carried out in imported gladiolus stock. A percentage of disease will be set, above which the shipment will be condemned, and if any disease is found in a shipment permitted entry, the grower will be notified of its presence and the necessary precautions to adopt.

8. The gladiolus industry has apparently grown to the stage where it would seem advisable to establish a form of inspection and certification of stock if the grower so desires it. It is hoped that such a service may be organized in order to raise the standard of disease freedom in the stock offered for sale by Canadian growers.

Further information on these diseases may be obtained from the following sources:

1. Drayton, F. L. The dry rot disease of gladiolus. Scientific Agriculture 6:6, 1926.

2. Massey, L. M. The hard rot disease of gladiolus. Cornell University Agricultural Exp. Station Bulletin 380, 1916.

3. McCulloch, Lucia. A bacterial blight of gladiolus. Journal Agricultural Research, 27:225, 1924.

4. McCulloch, Lucia. A leaf and corn disease of gladiolus. Journal Agricultural Research, 29:159, 1924.

NOTE—The Division of Botany, Central Experimental Farm, Ottawa, will be glad to receive specimens of gladiolus diseases for identification. Parcels under 16 ounces in weight and addressed to the Dominion Botanist can be sent free of postage. Where insect injury is responsible for injury to the gladiolus, specimens should be sent to the Dominion Entomologist, Birks Building, Toronto.

The report of the Committee appointed to go into the matter of redistribution of districts was as follows:

District 1—Stormont, Dundas, Glengarry, Russell, Prescott.
" 2—Carlton, Lanark, Renfrew, Leeds, Grenville.
" 3—Durham, Haliburton, Northumberland, Peterboro, Victoria.
" 4—Frontenac, Hastings, Prince Edward, Lennox and Addington.
" 5—Ontario, Peel and Simcoe.
" 6—Dufferin, Halton, Norfolk, Wentworth.
" 7—Bruce, Grey, Huron.
" 8—Wellington, Waterloo, Brant.
" 9—Elgin, Lambton, Middlesex, Oxford, Perth.
" 10—Essex and Kent.
" 11—Muskoka, Nipissing, Temiskaming.
" 12—Manitoulin Island, Parry Sound, Sudbury and Algoma.
" 13—Haldimand, Lincoln, Welland.
" 14—Kenora, Rainy River, Thunder Bay.

The Chairman of this Committee moved that the Secretary be asked to send a list of societies, with number of members, to each district director.—Carried.

It was here moved by Mr. Carter, seconded by Mr. Wilkinson, and unanimously carried:

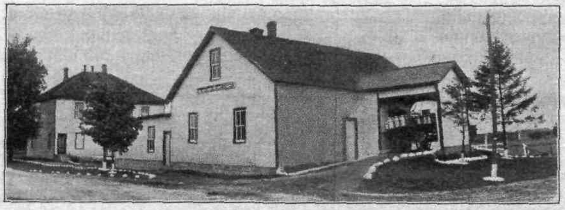
That a hearty vote of thanks be tendered to the Minister of Agriculture, Ottawa, for the splendid work being carried on on our behalf by Mr. Gibson, Mr. McLaine and Mr. Drayton, of his Department.—Carried.

EYESORES GIVE WAY TO BEAUTY SPOTS

W. H. Porter, London

After relating how the Farmers Advocate had put on a competition for the beautification of cheese factories, Mr. Porter said: The flower end and the beautification of the factories took hold in such a way that we were very much surprised. We saw in it an opportunity for general beautification, and we therefore approached your secretary, Mr. Wilson, who took it up with your directors, and a prize was given in Eastern and one in Western Ontario. This identified your Horticultural Association with the competition, and in 1926 the results from the viewpoint of beautification and the growth of flowers was even still more remarkable. I am not going into that angle of it very much. The slides will show that. But it did the cheese factory industry a great deal of good. I have seen visitors from the United States stop and take pictures of the factories and the flowers around them.

And at the same time we had this thing in mind, that if the cheese factories and rural institutions of that kind could be beautified, like the little boy who



Cheese factory—Winner O.H.A. Prize—Western Ontario.

washed his face in the morning, the idea spread through the whole school, then through the community until everyone was clean, we thought that that would spread through the whole community. Before I have the slides I want to give credit to your association for the stimulus that you have given to this movement, and I hope that your association will carry on this work through your local districts, and I want to give credit to the Minister of the Department of Agriculture, and particularly the Director of Dairies, Mr. Geo. Barr, and his colleague, Mr. McLennan,—everyone who could all along the line seemed to get in on this and enjoy it as much as we did.

Mr. Geo. Barr knows all the cheese factories inside and out, and he has over fifty slides of his own prepared, and I am going to ask him to show you about fifteen of those of the more pronounced ones, and tell you a few things about each one. He then introduced Mr. Geo. Barr, the Director of Dairies, in the Province of Ontario, who showed the slides and commented on them.

Mr. Tebbs reported for the Committee which was to meet the representatives of the Eastern Canadian Nurserymen's Association, and as the result of the Conference the following resolution was presented to the Convention by

Moved by Mr. Tebbs, seconded by R. R. Graham:

That this Convention recommends to the Horticultural Societies of the Province the advisability of purchasing their premiums as far as possible from recognized Canadian nursery firms who supply Canadian grown and acclimated stock.

And further in order that societies be able to obtain the lowest prices from such firms, we urge them to confine their premiums each year to as few varieties as possible.—Carried.

REV. MR. TEBBS: In supporting the resolution, the nurserymen have stated that they will quote the 100 rate for minimum orders of 25 plants of any variety; they guarantee to supply no imported stock. If they have not got what is asked for, they will frankly say so. Mr. Bailey, the secretary of the Nurserymen's Association, will supply the secretaries of the societies in the Province with a list of standard grades of shrubs. They furthermore stated that stock is usually not sold by age but by grade. By grade is meant size, and that they desire to as far as possible render the best service possible to all the horticultural societies of the Province.

H. J. MOORE: I have had some connection with Professor Graham in juvenile work. The judge inspects gardens and awards prizes, and the children exhibit their product at the shows and get prizes. In that way great interest has been inculcated in the children not only to win prizes, but they will learn to love these things and as years go by when they become adults they will desire to continue this good work and they will eventually become members of the Horticultural Society.

MR. LAITHWAITE, Goderich, endorsed what Mr. Moore had said, saying they had 250 members in their Junior Horticultural Society. He stressed the fact that a child must have a goal in order to work at anything, and when you give them that they will work their gardens very industriously, and in that way, a lasting love of the work is inculcated.

MR. OCCOMORE thought the theoretical botany which was now being taught in the schools might well be replaced by some practical teaching of how to grow things. A friend of his had told him in Collingwood that both his daughters studied botany, did not understand at all what they were studying, and neither could transplant a lettuce head.

MR. JURY: There is a summer course and the Government supplements the school teacher's salary if they take it. It seems to me that we could make better progress by utilizing the school teachers of our provinces. If we could get the young ladies to take this summer course we would do more toward furthering the work of horticulture than any horticultural society can do.

MRS. SANDERSON, Preston: Last year we judged over 150 children's gardens. The seeds were supplied by the Daughters of the Empire and the prizes were also awarded by them. The children took a wonderful interest in their work and produced some splendid gardens.

MRS. MEADES, Etobicoke: Although our society is only in its infancy we had a Flower Show for the children last year. We gave them seeds in the schools and the children brought their flowers in in the fall to have them judged. It was surprising to see the interest taken by the children. In our society we also have a blackboard and members write on it the plants they would

like to give away, and then people come to our gardens and get them in the spring. In that way the children get a great many bargains and it is encouraging to them.

It was moved by Mr. Byam, seconded by Mr. Pearen:

That the matter of tariff revision be dropped from the agenda.—Carried.

Mr. Geo. Simpson, Chairman Resolutions Committee, reported as follows:

The Committee on Resolutions beg to report that certain resolutions were submitted to them. They recommend the following to the favourable consideration of the Convention:

1. That this Association has noted with gratification the suggestion of the Hon. John S. Martin, Minister of Agriculture, in regard to the augmentation of the staff of horticultural lecturers, and believes that this step will greatly assist the progress of our work in the Province.—Carried.

2. That this Association requests the Ontario Government to take some action this year regarding improvements required by the Horticultural Department at Guelph and especially the provision of new greenhouses.—Carried.

3. That the directors look into the possibility of the Ontario Horticultural Association holding a spring flower show, annually, this show to be held in different centres from year to year.—Carried.

4. That the Honourable the Minister of Agriculture be asked to give favourable consideration to our application for an increase in the appropriation for the encouragement of Horticultural Societies, and that in the event of such increase being granted it be understood that a certain percentage shall be devoted to the prosecution of juvenile work.—Carried.

5. Viewing with dismay the wholesale destruction of our wildflowers and native shrubs, owing to their being pulled up by the roots by people who fail to realize the unfortunate results, the members of the Ontario Horticultural Association are urged to exert their influence to create a sentiment in favour of conservation of natural beauty in its different forms and especially the protection and preservation of wildflowers, shrubs and trees.

6. That this Association place on record an expression of appreciation of the magnificent floral decorations provided for the convention hall and banqueting room and that thanks be extended to the Toronto Horticultural Society through its able president, Mr. Lionel Godson.—Carried amid applause.

7. That the thanks of the Association be conveyed to the management of the King Edward Hotel for courtesies extended to this Association during its annual convention.—Carried.

8. The Ontario Horticultural Association, determined to retain its distinctively amateur and educational character, looks with disfavour upon any departure from that principle and urges affiliated societies to confine their activities relative to the distribution of planting materials to their bona-fide members and to the localities in which they are operating; but this resolution shall not be interpreted as imposing any restriction upon the right of societies to procure and distribute premiums among their members.—Carried.

9. This Association, desiring to maintain the principles laid down by its founders and embodied in the Ontario Horticultural Societies Act, and to preserve its amateur and educational character, declares that the offices of President, Vice-President, Second Vice-President and District Directors should be reserved for members of unquestioned amateur standing and that persons engaged in the business of horticulture shall not be eligible for election.

Provided, however, that this declaration shall not apply to individuals who now (1927) occupy any offices and shall not debar an amateur gardener who disposes of his surplus product but who is not dependent upon horticulture for his livelihood.

And further that it shall not affect the right of any otherwise eligible person to become a member of any Horticultural Society or a delegate to the Convention of the Ontario Horticultural Association.

In regard to disposal of stock it might be well to confine it to those who issue a catalogue or offer definite things for sale.

This resolution was carried as amended with the word "declares" substituted.

It was recommended by the Committee that the following resolution be referred to the Board of Directors:

Cheese Factory—Winner O.H.A. Prize—Eastern Ontario.

Moved by H. Occomore, Guelph, seconded by C. H. Janzen, Kitchener:

That a Committee of three members be appointed by the chair to interview the Minister of Agriculture with a view of laying before him the matter of the rearrangement of the work of this Association as per his suggestion of last evening, the members of this Committee to be as follows: Alderman J. Albert Smith, Kitchener; Rev. Mr. Howard, Listowel; Dr. Morrow, Maxville. —Carried.

The Committee recommend that juvenile work be strongly recommended to the favourable consideration of the members of the Association and that the Board of Directors be urged to co-operate to the fullest extent with the Director of Juvenile Work.

It was then moved by Mr. Simpson, seconded by Dr. Scott:

That the report of the Resolutions Committee be adopted.—Carried.

FLORAL ARRANGEMENTS AND TABLE DECORATIONS

MISS MILDRED GALBRAITHE, Toronto

There is nothing that gives greater pleasure to the onlooker or lends more distinction to a room or to the dinner table than a lovely and distinctive arrangement of flowers. Flowers are amongst the most vital considerations of physical life. Bread will nourish the body, but flowers will administer to the soul.

In discussing table decorations and floral arrangements for our homes to-day, let us, for comparison, go back a few decades to the days of King Arthur. That heroic monarch with his knights of the "Round Table" has been a synonym for community of interest and adventure. Great is the contrast between the material things of the mythical people of the long ago yesterdays and the luxuries of the moderns of to-day.

In all the illustrations of the Anglo-Saxon period, the table setting included the salt cellar, which was the first and most important thing placed on the table. Then-a-days the salt was of far greater importance than the necessary condiment as we know it. It was symbolic. Why, to sit above the salt was to sit in a place of honour, and until the salt was placed on the table no one knew his allotted place.

Later, in the brilliant days of the Wentworths, we hear of "most exclusive entertainments" at Government House, Halifax, N.S. Among the table ornaments, which were altogether superb, were exact representations of "Hartshorne and Tremaine's new flour mill," and of the "Old Windmill on the Commons," while the "Model of the Lighthouse at Shelbourne was incomparable," and also, a new tract of road was delineated in the most ingenious and surprising manner.

To-day, there is the development of beauty in our homes and our well-set table is centred with a charming arrangement of flowers. How fragrant, delicate and exquisitely beautiful; they are of nature's rarest contributions. Where can we find a greater pleasure than to arrange flowers, with their glorious colourings, lovely textures and fragrant perfumes around our homes? Their life is short, I grant you, and at times we hesitate to cut them at their best, but what higher purpose could they serve than go to cheer the sick room, or glorify our homes? We are told flowers have souls. Then we should feed their souls with our ardent admiration.

There are many ways of arranging flowers, but the secret of success is to make "pictures of them." It is said the Japanese have taught us how to appreciate the beauty of "arranged flowers." Well, this may or may not be true. At least we have learned to appreciate a slender vase with a single flower therein. The first principle of flower worship is to know enough to put a single exquisite bloom in a container by itself.

Personally, I think flowers ought to be arranged as nearly as possible as they grow. It is always a safe rule. And too, we should suit the flowers to the room. For instance, you would not use field daisies in an elaborately furnished drawing room, but rather roses, orchids or other flowers of a similar delicate type, while the daisies or marigolds would be quite in keeping with the furnishings in a living room. It is well to remember to have our flowers arranged on a natural level so you may look down on the blooms rather than arranged high where you see only container and stems and underneath the blooms. Plain, simple containers of glass or pottery are most effective. Figured containers are incongruous. Why make painted flowers rivals of the real? Just try arranging blooms in a vase with motifs yourself, and you will appreciate the

disastrous result. Always avoid overdoing it by attempting to crowd too many flowers in your container. Rather give each flower its individuality. Tall slender flowers require a slender container, for a mass a bowl is good, the low type to-day is favoured, and baskets of various types are always good. In arranging your flowers a few things that will be of great assistance are, namely, fresh blooms, few flowers naturally arranged, line if possible without repetition, sense of proportion, appropriate foliage, not too much water, container in relation to bloom, harmony, uniformity or contrasts.

In judging floral arrangements we use the following scale of points: Freshness of blooms, 15 per cent; naturalness, 20 per cent.; grace and beauty of line, 20 per cent.; simplicity, 30 per cent.; colour schemes, 15 per cent.; total, 100 points.

The flowers of the centrepiece should never mask the diners, making 'cross table conversation difficult, so we mass them low, or use an airy arrangement of blossoms. The centre bowl is always good, so is the use of two or four small vases arranged about the low bowl or placed well toward the corners. Candles have become a necessary accessory to complete our table decorations of to-day. No light is so quietly friendly, so conducive to a pleasant frame of mind as the "yellow ease of eyes," the "light that never fails." Preference to-day swings to the unshaded candle, especially when it is of the tall variety that carries the flame above the eye level, but if low candles are used, placing the flame on the level with the eye, shades should undoubtedly be used.

We will have, to-day, for our illustrations:

A Luncheon Table Decoration of Sweet Peas (pink and mauve) and maidenhair fern, using mirror and light green bowl (low type) with four small green containers with sweet peas, placed well towards the corners to balance the central arrangement, and favours of sweet peas.

A Dinner Table of Four Covers, Using Red Roses with plain black satin bowl with white lining (low type) and four white 27-inch tapers in plain black satin holders, two shoulder bouquets and two boutonnieres of red roses complete the scheme.

A Reception Table Arranged With Spring Flowers in an oblong mauve basket with handle, using daffodils, bronze tulips and gold tulips for the centrepiece. Two tiny oblong mauve baskets with the proportionate flowers and four mauve 18-inch candles in amber holders will complete the decoration.

I have taken care to use only the flowers which are grown out doors and in even the small garden.

Now we will spend a few moments on the special arrangements. We have a basket filled with a combination of spring flowers (daffodils, hyacinths, narcissi, snapdragon, tulips and pussy willows) suitable for living room or hall. Then too, I would like to call your attention to a light green vase with valley lillies and sweetheart roses, a small black vase with violets and one bronze yellow rose bud, a tall slender cutglass vase and a tall slender silver vase each one holding a single bloom, a small cutglass basket with three red roses. Any one of these arrangements would be suitable for a five o'clock tea table or a tea tray. Also here is a low arrangement of pansies (using a quaint old oblong fern pot).

A dutch blue jar with bronze tinted tulips, and three small arrangements (freesias, rose bud and sweet peas) suitable for a sick room tray, and several others which may be used as the occasion demands.

Simplicity is the keynote in all arrangements shown to-day, and in almost every instance I am using each flower's own foliage.

It is so difficult to stop here, there are so many interesting combinations and arrangements, that I could go on indefinitely but time will not permit. I have arranged my illustrations about the room where you have had the enjoyment of them all day, and the speaker has been answering questions and explaining many things during that time.

"No passion is more democratic than that of love for a garden. The love of literature, of art, of music, is limited to the gifted few. The passion for flowers, however, exists alike in the millionaire and the poor man; the day labourer returning from his work betakes himself to tending his rose bud, and so perhaps does the banker, learned and illiterate, saint and sinner, ill-tempered and serene are all alike in their tenderness for their plants.

I have here a basket of spring flowers arranged. It is a plain basket with a mat green base, and this is arranged principally to show you that flowers do not need further adornment. We do not need ribbon and tulle if we arrange the flowers simply and prettily; that is sufficient. This basket is suitable for a living room or hall.

Then I would like to draw your attention to this little thing,—a single green container; it is shaded from dark green up to light. And then we have arranged lilies of the valley and sweetheart roses.

Then this simple array of violets, freesias and one rose bud—just in their natural state, simple and pretty.

Then the Japanese have taught us to arrange a single rose in a slender vase and another one. This is another neat arrangement. Any one of these four that I have shown you are suitable for a five o'clock tea or tray. At all our exhibitions we are trying to teach people to arrange something small like this for a tea table.

I want to show you this simple cut glass basket for three roses. This is as pretty as it can be, it is just the way the roses grow.

Here is an arrangement of one rose bud in one vase of lilies of the valley and one rose bud, and freesias.

Another of one rose bud.

Any of these, continued Miss Galbraith, are suitable for a sickroom tray.

And this simple little piece—part of an old fern pot, with the pansies.

Then the Dutch blue vase with tulips.

REV. MR. TEBBS, on behalf of the Directors and many friends of Miss Galbraith in the Association, presented her with a basket of spring flowers.

REPORT OF THE JUVENILE HORTICULTURAL WORK FOR 1926

ROBERT R. GRAHAM, Ontario Agricultural College, Guelph

I desire to emphasize the importance of this phase of our Horticultural work, for if we can succeed in securing the interest of the boys and girls in growing flowers and vegetables in the home garden, assisting in beautifying their home surroundings, exhibiting their products at the flower shows, and competing in garden competitions, we need have no concern respecting the future progress of our Horticultural Societies. My rather limited experience in this work during the last year in my own city of Guelph, has convinced me that there are wonderful possibilities in the Juvenile work and that the time is ripe for the Ontario Horticultural Association to take definite steps to establish it on a proper working

basis and make provision for giving it adequate moral and financial support. All of you who have had any experience in the Juvenile work, will, I believe, actively support my testimony regarding its importance, and I think you feel that this convention should take the matter seriously and devote as much time as possible to the discussion of this report and see if we cannot put this work on the map. The work is worth while.

Early in the year, I prepared a tentative programme, discussed it with Mr. J. Lockie Wilson our secretary, Mr. Moore and others, and had a copy of it forwarded to a majority of the societies, particularly the larger and older ones. Its purpose was to serve as a guide or suggestions in respect to carrying on the work, or at least help the societies to make a start. The following is a copy of that programme, and I would emphasize the fact here that the Juvenile work was to be a branch of the regular societies and not a separate organization.

Tentative Plan of Juvenile Work

I beg to bring before you the matter of Horticultural work among the boys and girls of your communities. As yet we have no definite plan of work for general adoption, but if each society will earnestly undertake some work best suited to its own conditions and co-operate with us, we should be able in due time to decide upon the best policy to adopt.

Suggested Programme

Get one or two persons in each ward of your city or town, or in each rural school section as the case may be, to supervise the work, preferably active members in your local society. These persons, if possible, should meet occasionally to discuss the work and make their plans. The personal touch and interest will be the big factor in this work.

The Major Duties of the Supervisors

I would suggest that they endeavour to get better acquainted with the boys and girls and encourage them to enter the Garden Competitions which have been a great success among the adults. Their garden work could be judged at the same time as the gardens of the older people. Prizes of some sort should be given and probably six prizes in all, so that a greater number each year would share in the awards. Work undertaken by the contestants should not be too heavy and extensive, but rather simple. Quality rather than quantity should be the chief aim. It might consist of growing a small bed or a few choice varieties of different flowers; gladioli, pansies, tuberous-rooted begonias, etc., etc., or caring for a little lawn, or two or three window boxes, growing a few perennials, etc. There is such a variety of little garden tasks to choose from that no one should find any trouble in making a happy selection of one or two.

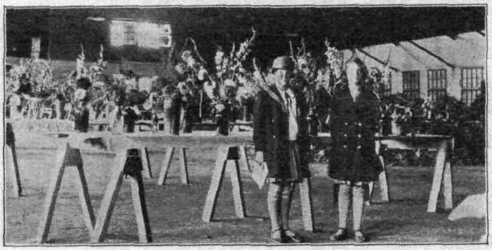
In the second place, make the Annual Flower and Vegetable Show interesting for the boys and girls by setting apart a definite place in the show room for their exhibits, and donate prizes. In Guelph this plan has worked out well, and this year it will be made still more prominent; for instance, a cash prize is given to the boy or girl winning the highest number of points in the show. These two lines of endeavour I think are fundamental in this work, and therefore I would urge that you expend your time and energy mainly in developing them to the greatest possible extent. Start this year and give the plan a fair trial.

MINOR SUGGESTIONS

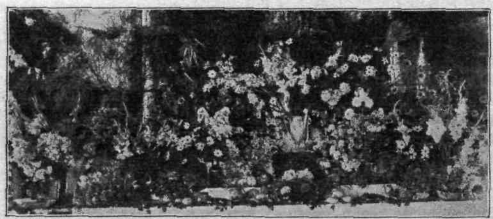
The local newspapers are usually very sympathetic towards the work of the Horticultural Societies, and are always glad to get articles on garden topics. Why not feature boys' and girls' garden work under a column of their own.

Suggest to the art teachers of the schools, or any teacher, the subject of garden art as a suitable subject for drawing, sketching, painting, etc. Their work might constitute a very fine exhibit at the fall show. Likewise garden photography.

Arrange for visits by the boys and girls to the good gardens or beauty spots in the community.



Juvenile horticulturists.



Prize juvenile exhibit.

Encourage the boys to build bird houses and stage a bird house show in the spring.

Once this work is well under way in a community, the boys and girls could stage a flower show of their own and the flowers be sold and funds given to the Children's Shelter or to some benevolent cause.

These are a few of the lines of activity that might be undertaken but there are others that you may consider better for your own conditions, and our hope is that you will become interested in developing the boys' and girls' work along whatever lines you find most acceptable and workable.

Juvenile Work in Guelph City and Adjacent Townships

For our own satisfaction we endeavoured to put this programme to the test in Guelph, and the plan as a whole worked very well.

The first thing we did was to get out an attractive poster in two colours, and put it into every school of the city, in the children's library, in store windows and other prominent places. The poster emphasized work that the boys and girls might undertake, and listed the prizes given for garden competitions, and exhibits at flower shows, etc., and with an appeal to them to become members and enter the competitions. Many of the teachers spoke to their pupils about the importance of the work. Two or three members of our Executive undertook to interest boys and girls of their communities in our plan, and the result was that we got a dozen or more members and most of them entered their little garden plots in the Lawn and Garden Competitions. These were judged during August and prizes awarded at the time of the Flower Show. There were six prizes in all, the first being a silver cup donated by Mayor Beverley Robson to the boy or girl having the best garden in the city. The other prizes were silver and bronze medals. There was a very good list of entries in the Flower Show and the interest was marked. The prizes here were money and several useful articles, the contestant who got the highest number of points in the show receiving a cash prize of $3. Two or three of the public schools of the townships staged very fine exhibits from their school gardens and won valuable prizes. These exhibits were the most interesting ones at the show and reflect great credit upon the youngsters and their teachers. A greater campaign will be prosecuted this year and probably along much the same lines.

In Guelph township the work progressed very well under the guidance of Miss Gertrude North and the teachers of the schools. They enrolled 40 members, charging 25 cents per member, and the chief features of the year's work were Rally Day in May at one of the schools, exhibition in August, and school display contests, school gardens and distribution of seeds and bulbs as premiums to plant in their own gardens.

The Questionnaire as a Follow-up

Towards the end of the year a questionnaire was prepared and sent out to the Societies for the purpose of finding out what they had accomplished during the year, and to afford them an opportunity to make suggestions as to the best way of conducting the Juvenile work.

The returns were not large, but a considerable amount of information and several suggestions were received, and therefore I think the thing was worth the doing, at any rate we know now the active members in this line of endeavour and one cannot but feel that the work is growing.

The results of the survey show the following things:

1. That very few of our regular societies have attempted the development of the Juvenile work, but quite a large number are getting interested.

2. The membership per society varies all the way from 12 to 250 and the fee is either 5 cents or 25 cents.

3. The plan of work for the most part consists of giving the children seeds, plants or bulbs to grow in their own gardens and exhibit at the fall show. A few have children compete in garden competitions.

4. A few suggestions have been made in regard to further development of the work, one is that the Juvenile work should be a separate organization with its own president and officers, another that the Horticultural societies secure co-operation of the schools, that the societies supply children with seeds and offer prizes for flowers and vegetables, etc.

REPORT OF COMMITTEE ON NAMES AND VARIETIES

Notes on the Best of the Newer Tall Bearded Irises at the Central Experimental Farm, Ottawa, 1926.

By W. T. Macoun, Dominion Horticulturist

There is a very keen interest in the iris in the Province of Ontario, and the number of persons to establish collections of the best is increasing rapidly. At the Central Experimental Farm, some 350 varieties of tall bearded iris are under test and most of these are good, the plan being to grow the better sorts only, whether they are old or new. There are so many of the newer ones that are superior to the old that it is desirable to draw the attention of those who have not got them already to such. Hence the following notes are given:

1. White predominating on standards and falls: Kashmir White was the most outstanding white this year. It is tall and conspicuous on this account. White Knight because such a free bloomer is still one of the best. La Neige and White Queen are also good.

2. White feathered and suffused with bluish lavender and bluish purple: Anna Farr is perhaps the most beautiful, but it is a poor plant maker and poor bloomer at Ottawa. The same may be said of Ma-Mie, which is one of the most attractive. Camelot is one of the most satisfactory in this group. It is tall and a free bloomer. Mrs. G. Reuthe is, however, still one of the best.

3. White or white and purple standards and purple falls: Mary Williamson was again considered superior to Rhein Nixe.

4. Yellow predominating on standards and falls: Shekinah did well this year and, while not as deep a yellow as one would wish, is sufficiently taller and better than Flavescens to mark a distinct advance in this colour. Gold Imperial, another of Miss Sturtevant's varieties, is of deeper colour. While this has not yet bloomed at Ottawa, it was exhibited there in 1926.

5. Pale yellow standards and violet purple falls: None of the newer varieties tested which would fall in this group are as good as Princess Victoria Louise.

6. Yellow standards and brownish or maroon falls: The best of this group in 1926 was Flammenschwert (Flaming Sword). It is somewhat like Marsh Marigold and Knysna but broader in the fall and better than either. Iris King is still one of the best.

7. Lavender blue and bluish purple predominating on standards and falls: Many of the newer varieties are in this group. There are so many good ones in this group that it is difficult to suggest what might be considered the best, but every good collection should include the following: Ballerine, Lord of June, Morwell, Queen Caterina, Eden Philpotts, Lady Chas. Allom.

8. Bluish purple standards and bluish purple or deep purple falls: Two of the best again in 1926 are Crusader and Rodney. Lent A. Williamson continues one of the most satisfactory but Alcazar, though much like it, should still be grown. E. H. Jenkins was fine in 1926. The variety Gabriel is said to be better but this has not bloomed at Ottawa yet. Magnifica was very fine this year.

9. Pale purple standards and purple falls: Of the older varieties Perfection is the best, but B. Y. Morrison is better. Both, however, should be grown.

10. Purple standards and purple or dark purple falls: There are some very fine varieties in this group. Perhaps the most outstanding of those bloomed at Ottawa is Mount Royal, originated by F. Cleveland Morgan, but not yet for sale. Souvenir de Madame Gaudichau is very fine but Aurelle, blooming at Ottawa in 1926 for the first time, may prove to be more desirable judging by this year's experience. Dominion, while a great beauty, does not multiply rapidly and has not bloomed freely so far.

11. Pink, lilac and rose predominating on standards and falls: Among the older irises there were few good varieties in these shades, but among the newer ones there are several very fine ones. Some of the best of these are Dream, Delight, Susan Bliss, Aphrodite, Lady Byng, Lorraine Morgan is a good one also, and Mlle. Schwartz while it might be put in another group is placed here. It is one of the very finest varieties.

12. Reddish purple predominating on standards and falls: The finest quality of this group bloomed at Ottawa is Asia, though it has not multiplied well nor bloomed freely. Other good sorts are Opera, Medrano, Sweet Lavender and Mount Penn.

13. Dusky or dull coppery standards and rich maroon falls. Ambassadeur is the best of this group that has bloomed at Ottawa, but Bruno exhibited at Ottawa in 1926 is larger and finer than Ambassadeur. A very effective iris in this group is Deuil de Valery Mayet.

14. Buff, lilac and fawn blends predominating on standards and falls: Some of the best of those which might fall into this group are Afterglow, Dejazet and Sherbet.

It is desirable to lengthen the season of tall bearded iris as much as possible both by having some of the earliest and some of the latest varieties. Following are some good late ones which are well worth growing for this purpose apart from their decorative value,—Raffet, Medrano, Grevin, Nine Wells, Peter Barr, Opera, Violacea Grandiflora, Tintallion, Monsignor, Lord Salisbury, Ballerine, Prospero, Sindjkhat, La Neige, Asia, Magnifica, Porcelain, Trianon.

Notes on Some of the New Irises by W. E. Saunders, London, Ontario

Asia has upheld all of its very fine reputation and was awarded "Best Spike" at one of our shows.

Chatelet was admired exceedingly and is apprently going to stand about at the head of the light pinks.

Delicattessa and Gazelle two of Perry's proved to be identical and inferior and were immediately fired.

Flammenschwert was more brilliant than Iris King and better.

Fismes and Madame Durrand were two of Millet's that flowered for the first time last year and attracted universal admiration. Durrand I place right beside Ambassadeur and Asia as the very finest.

Imperator and Peau Rouge are much alike in colour; the latter is rather small, but Imperator is exceedingly fine.

Mother of Pearl proved to be so like Mlle. Schwartz that it seemed hardly worth while introducing it.

Mrs. Walter Brewster is much inferior to Ballerine.

Micheline Charviaire promises to be the finest white and has a strong narcissus perfume, making it exceedingly desirable.

Madame Blanche Pion flowered and was immediately discarded.

Prospero continued its fine record and is considerably better than Lent A. Williamson.

Rhein Traube one of Goos and Koenemanns new ones flowered and was discarded.

Chasseur proved to be somewhat better than Shekinah.

Seminole is more brilliant than Caprice and Ed Michel and probably preferable to either.

Seagull (Farr) proved to be not very desirable and was nearly thrown away.

One or two of Mr. Williamson's Butterfly-named variegatas flowered and were inferior to the older varieties of this type.

SOME OF THE NEWER ROSES

Isabella Preston, Ottawa

"Agnes." As this rose was awarded the Van Fleet Gold Medal of the American Rose Society in 1926, it will be of interest to describe it here. It was raised by the late Dr. William Saunders at the Central Experimental Farm, Ottawa, in 1900, by crossing Rosa rugosa with Persian Yellow. It makes an attractive shrub with its bright green rugosa type of foliage. The flowers are double, pale amber in colour, fragrant and early. The plants have never shown any signs of winter injury at Ottawa where they receive no protection of any kind.

In the Rose Garden, the following new varieties were noted as being outstanding during the summer of 1926.

Betty Uprichard.—This is one of the best of the new roses, a good grower and not very subject to disease at Ottawa. The inner face of the petal is salmon while the reflexes are dark rose.

Columbia.—This favourite greenhouse rose does well in the garden. The flowers are a good shade, deep pink in colour and fragrant.

Duchess of Wellington.—This cannot be considered a novelty as it was introduced in 1909, but it made such a splendid display in the garden all summer and autumn that it should be better known. Good yellow.

Edel and Edith Cavell.—Two white hybrid teas that are not quite hardy enough for Ottawa conditions, but are worth growing in a milder district.

White Ophelia.—Bloomed well all summer and is a beautiful rose. As it was only planted in spring, nothing can be said about its hardiness.

Emma Wright.—This is one of the most attractive of the orange shade roses. It is perhaps not double enough to please everyone. The buds are particularly beautiful.

Lady Inchiquin.—Although this rose is not so floriferous as one would wish, it is such a brilliant shade of pink and good shape that most people will want it.

Lady Maureen Stewart.—This is a very beautiful dark red rose, but like Lady Inchiquin it is not a very free bloomer.

MME. BUTTERFLY.—This is a deeper coloured Ophelia and has all the good qualities of that desirable rose.

MRS. OAKLEY FISHER.—This is a single rose with beautiful buds and good glossy green foliage. The colour is apricot yellow and the plant is very floriferous.

MRS. RAMON DE ESCOFET.—A strong growing rose with large full brilliant crimson flowers. Very floriferous.

OLIVE WHITTAKER.—This is not a very full rose but it is very floriferous and the colour is a very attractive coppery pink. The foliage is dark red and showed no signs of disease in the summer of 1926.

REV. F. PAGE ROBERTS.—The colour of this rose has been described as orange gold to saffron yellow and again as fawny yellow. It is a very beautiful colour. Very full and has dark green foliage.

VESUVIUS.—One of the most beautiful of the single roses. Bright scarlet crimson.

QUESTIONS AND ANSWERS

Q.—What is the best preparation to cope with the apple grub? When is the proper time to spray the trees to control it?

A.—Arsenate of lead, spring and summer, spray three or four times. For apple maggot spray last week of June, in Niagara Peninsula; first and second week of July, north of Lake Ontario.

Children's exhibit.

Q.—How can a society co-operate with a local seed firm to the advantage of both?

A.—Only by the seed firm stocking or procuring first-class seeds and selling at reasonable prices, and by the society or members thereof purchasing if quotations are right.

Q.—What are the best varieties of bedding plants for flower beds on streets where there is no water supply?

A.—Same as for any place. Where water does not exist it must be carried to the plants; geraniums, coleus, salvia, verbena and canna are good kinds.

Q.—Which gives the larger number of bulblets, deep or shallow planting of gladioli?

A.—Depth of planting has little, if anything, to do with the production of bulblets. Varieties naturally differ in their power to produce them. The average depth of three to five inches is favourable to the normal production of bulblets.

Q.—What care should be given a Horja Carnosa to make it bloom?

A.—Allow the plant to become root bound in the pot and train the stems on a sunny wall in the sun-room or greenhouse. Rather than over pot, use a little liquid fertilizer occasionally.

Q.—What perennials are easiest to grow from seeds?

A.—Larkspur, oriental poppies, holly hocks, coreopsis, gaillardia, lupines, michaelmas daisies, arabis and perennial candytuft.

Q.—What is the cause of blight of buds on a cyclamen?

A.—The plant is probably attacked by insects, thrips or mites.

Q.—What evergreens would you recommend for foundation planting?

A.—Pinus mughus, thuya globosa, Japanese yew.

Q.—What can I do to make a three year old robust rose bush bloom?

A.—If the rose bush is a true garden rose and not a sucker growth from an old stock, prune it severely during April. Cultivate around the plant and fork in a handful or two of bone meal.

Q.—Is there a law against planting the variegated barberry?

A.—We do not know the variety or species you mention. If the low growing Japanese one, it may be planted. Most barberry, however, are banned on account of the fact that they harbour spores of the wheat rust.

Q.—What is the best time to prune Japanese hydrangea?

A.—The time to prune a hydrangea, the "Hills of Snow" type, or the Paniculata type is spring, and the growth will be made after pruning, it will flower in the autumn.

Q.—Would a person who, as a side line, imports and advertises himself as an importer and sells to make money, be classed as an amateur or professional gardener?

A.—Professional.

Q.—Please name a good book on "Hybridizing?"

A.—A very good book is that by Dean Bailey, of Cornell. If you want a scientific book get Mendel's Principles of Heredity by Bateson.

Q.—Is there a law against vandalism for trees or shrubs on the public highway?

A.—Yes; everything which exists between the fences on the right of way is controlled by the Highways Act. Obtain the Act from the Department of Public Highways of Ontario.

Q.—Do you know if "Parks Floral Magazine" is still published in U.S.? If so, what address?

A.—I do not know.

Q.—Should the president stay in office more than two years?

A.—I should advise retaining him if he is good.

Q.—Do any of the societies pay a salary to their officers?

A.—Some of the societies give an honorarium to their secretaries.

Q.—May a Horticultural Society charge a membership fee of 50c and also one of $1 if an option is taken?

A.—The Act says the membership fee is $1. You may charge a higher fee if you like, but the legal fee is $1. You can't charge any less.

Q.—How many societies pay their secretary an annual fee?

A.—We have no record.

Q.—How many shows do you deem it advisable to have during the year?

A.—I would suggest for the young society one annual show, and for the growing society you might have a spring and fall show.

Q.—What is the best work on hybridizing and where can one procure it?

A.—Bateson's book on Mendelism from any well-known publisher.

Q.—Is it allowable for directors or members of a show to be in the hall while flowers are being judged?

A.—It is permissible for exhibitors to be in the room, but it is not ethical for any exhibitor to go around with the judge unless he gets permission from that judge and desires to ask a few questions, and on no circumstance should he be around when his own exhibits are judged. While permissible, it is not a wise practice to have the exhibitors around. The executive should rule against it.

Q.—Suppose the secretary is an exhibitor and accompanies the judge, as he or she usually does, placing prize tickets?

A.—The secretary should not be present when his or her exhibits are being judged.

Q.—Is it lawful for Horticultural Societies to pay money or commission for securing members?

A.—There is nothing in the Act to say it is not. It is simply a question of whether it is ethical to do it.

Q.—What is the cause of mildew or rust on a hydrangea paniculata? Will you suggest a remedy?

A.—Mildew is a fungus disease and so is rust. Mildew is largely fostered by cold drafts in the evening when leaves are covered with moisture. For that reason you should never spray in the evening. Rust on plants is also a fungus disease. To control mildrew spray with half an ounce of lime of sulphur to each gallon of water. For rust spray with bordeaux mixture.

Q.—Does a cyclamen need lots of water while in flower?

A.—Yes, but it should not be over-watered. The best way to tell is to tap the pot; if it rings, it needs water.

Q.—How is the grant apportioned to Horticultural Societies?

A.—The first year, if a society in organizing obtains 75 members, it will get $75 of a grant; if it gets only 50 members $50; $25 for 25 members. In the second and succeeding years, the grant is based one-third on membership and two-thirds on expenditure of the preceding year.

REPORTS OF DISTRICT DIRECTORS

District 3—Geo. Vickers, Barrie

This district comprises the Counties of Peel, York and Simcoe and throughout these three counties the work of the various Horticultural Societies take a prominent part in the activities of the several localities. There is a rapid growth of the spirit of Horticulture that is not only confined to the cities and towns, but extends to the far corners of the rural districts, and I find a demand for assistance and instructions far beyond the possibilities of an average amateur to accomplish. Some requests for official visits were refused with regret owing to the limit of time at disposal. The value of the Horticultural Society in the work of community welfare cannot be over estimated, and in this connection I may mention the valued assistance of the influence of the Women's Institutes which in many cases effect the organizing of Horticultural Societies. This is especially so in villages and townships. The extension of this part of their programme is of great benefit to our work as an association.

Your director was active in procuring speakers for a number of societies' meetings, also helping in the revival of two societies, procured judges for seven societies' shows and acted as judge at seven others, which prompts the suggestion that societies holding shows should communicate with their nearest sister society that there should be no conflicting of dates, as the demand for judges increases as the societies grow, and it is sometimes difficult for one judge to attend more than one show on the same day.

The work of your director has assumed such large proportions that it is difficult to meet the demand upon his time, and assistance was chiefly confined to the work of the smaller societies and in preparation for the formation of societies in the rural districts.

DISTRICT 4—REV. GEORGE W. TEBBS, BURLINGTON

From a weather point of view the year 1926 has not been exceptionally favorable to Horticulture in our district. Nevertheless the many societies in the district report considerable progress. Applications are coming in to me to assist in the formation of new branches in townships and villages as yet unorganized, and 1927 should see our Association with a large increase in membership. I have either visited or written to every society in my district during the year, and have been delighted with the enthusiasm and splendid work accomplished everywhere. It would materially assist your director in making this annual report if each secretary would see that a short account of the work of his society is sent to him at the time the annual statements are presented at the annual meeting of the branch. If any branch is not mentioned specifically in this report, it is because the secretary has not answered my letter requesting such information for the general benefit of the members throughout the Province.

NELSON.—Membership increased from 40 to 60. There were 183 entries at the annual flower show and $21 worth of bulbs were distributed to members.

GRIMSBY.—Membership 262. Expenditure nearly $600. Five flower shows were held of tulips, roses, irises, gladioli and dahlia. Held a Garden Contest for a Challenge Shield. Vacant lot cultivated and maintained. The society suffered a severe loss in the death of Mr. T. P. Jenkinson, who for many years filled the offices of president and director.

ST. CATHARINES.—Total membership 369. At the shows held there were 1850 exhibits of flowers, 380 of fruits, and 72 of vegetables. The flowers were sent to the hospitals and industrial home. No options were given away to the members this year.

BRIDGEBURG—360 members. Distributed 10,225 bulbs, 900 perennial plants, and 325 shrubs and rose bushes. Held 10 regular meetings during the year with 3 illustrated lectures. Planted 35 trees on public streets; also planted the grounds round the pump house. Held a very successful show in August.

ERIN.—Conducted a campaign resulting in a membership of 93. Distributed 300 boxes of annuals, 90 roses and perennials, 7 dozen potted plants, and nearly 300 bulbs. In the fall distributed over 1,400 bulbs besides planting on street beds dahlias, petunias, stocks, etc., and several hundred tulips. A contest in lawns and gardens was held very successfully as well as window displays, the flowers being distributed after to the sick and shut-ins. Assisted in the [illegible]

HAMILTON.—Several educational lectures were given during the year. An Iris show was held as a preliminary to the Rose and Peony Show, the most popular feature of the show being the decorated tables. Seven of these were arranged by local ladies, the accessories being loaned by local merchants. The show was very much overcrowded, making a larger building necessary another year. Co-operated with the Parks Board in furnishing additional roses, mostly climbers, for Gage Park Rose Garden, also plantings of peonies and irises. In co-operation with the Board of Education, they expect this year to landscape and plant the grounds adjacent to one of the new Collegiate Institutes at considerable expense.

BURLINGTON.—Continued to do the good work of past years. A membership of 324. Brant Park on property belonging to the C.N.R., graded and filled last year at the entrance to the town, has been seeded, planted with shrubbery and surrounded by a hedge; also four large flower beds were made. An old armoury shed was taken down and the land was given over to the society to level and seed. Borders at the Radial Park have been enlarged and planted and the shrubbery rearranged. 4,000 tulip bulbs were planted in the various public beds to bloom this spring. All the parks were cared for by the society during the year. One of the nursery firms in the town donated and planted the shrubs in Brant Park, and six signs donated by another citizen of the town, naming each park and stating the work was done by the Horticultural Society. Another citizen also installed a water service to one of the parks, and others donated a large number of perennials for the enlarged beds. The Town Council gave the usual grant in aid of the work undertaken in the public parks and flower beds in the town, while the local press gave splendid publicity. A very successful Flower Show was held in the month of August.

WELLAND.—Two very successful shows were staged, the Rose Show being honoured by the Delegates of the American Rose Society who were on a pilgrimage through southern Ontario. The society has adopted the rose as its civic flower, and is adding to the rose garden which will become one of the most extensive in the Province.

MILTON.—Has had a very successful year and done much in beautifying the town. Flower beds were planted all round the Town Hall and eight other beds along Main Street. 5,000 tulips have been planted for the coming spring, and the three church grounds beautified with flower beds. Everybody is very enthusiastic about the work of the society and a good year in 1927 is anticipated.

SMITHVILLE.—Membership was increased considerably over the previous year. Tree planting was undertaken, and public flower beds maintained.

NIAGARA FALLS.—Distributed over $500 worth of options to members. Planted a large number of flower beds which were afterwards cared for by the Parks Board. Planted over 100 maple trees, and 50 others supplied to members of the society. Co-operated with the Parks Department in grading and seeding one of the boulevards, the residents forming themselves into a Community Club to look after the vacant lots adjacent. Held a successful show with increased entries over those of 1925. The society did considerable advertising, distributed literature, supplied loam and manure to members for their gardens.

DUNDAS.—Has undertaken civic improvement work which is greatly admired by visitors. Had several lecturers during the year, and encouraged the taking of horticultural periodicals by the members.

OAKVILLE.—Progress made during the year in membership. Held a very successful Flower Show and had five illustrated public lectures. This year a plant exchange will be undertaken as well as the improvement of a few vacant lots around the town.

Finally your director has been requested to deliver a series of Horticultural talks over the radio from Station CKOC Hamilton, weekly during the coming spring months.

DISTRICT 5—WM. HARTRY, SEAFORTH

Our societies in district No. 5 have made splendid progress during 1926. Two new societies were established, and this district is about 95 per cent organized, there being only a few places where a society would be profitably worked. It is pleasing to see some of our rural societies with over 100 members and having flower shows each year. Horticultural work was never so popular as at present in this section. I had the pleasure of judging at fourteen flower shows and spoke at eight of them. There has not been one failure in district No. 5, but a steady increase along the line.

DISTRICT 6—DR. B. W. LINSCOTT, BRANTFORD

District No. 6 had a banner year. The societies in Brant, Waterloo and Wellington counties have done admirably in spreading the gospel of Horticulture to those not only living in these counties, but to those in adjacent counties and other parts of the Dominion, also citizens of the United States have been benefited.

Although every society has done its best, a few outstanding features should be mentioned. Kitchener carried out a wonderful flower exhibit in August.

Galt society, as it always does, put on several educational features, first a big peony exhibition as well as the wonderful display at their Civic Peony Plot. This garden is now in grand shape. Every one should see Galt at peony time. Their annual flower show was also complete.

Guelph's annual flower and vegetable show as usual did much horticultural good. People should not forget the O.A.C. at Guelph. In summertime all seasonable flowers are grown in profusion and all named are to be found. The gladioli trial plot is a most interesting one in July, August and September.

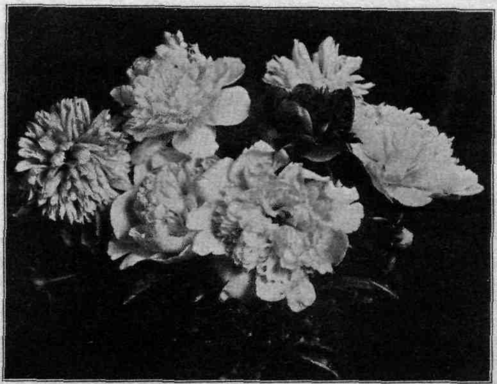
If you want to attend a real rose show the society at Paris can delight your hearts. Paris people can and do grow wonderful roses. Their June show was excellent.

Brantford society always on the alert every year, did not lack in 1926. They held a beautiful Iris show in June and their annual fall flower show was the best yet. Brantford has now a trial garden of all varieties of flowers. This garden, inaugurated last year, was sponsored by the Horticultural Society of Brantford Parks Board. Brantford's annual lawn and garden competition is doing a wonderful work in beautifying home surroundings, sponsoring a happy and contented people.

DISTRICT 8—FRED COLLINS, CHATHAM

We have fifteen societies in this district. I have written to thirteen of these and have received replies from Amherstburg, Leamington, Essex, Thamesville, Windsor, Bothwell and Ridgetown. The reports received are very encouraging, the membership in one case, Amherstburg, having been more than doubled. All reports show that good work is being done in beautifying the towns. Excellent work is being done in Chatham.

A new society has been organized at Dover Centre; this is a township society and is creating a good deal of interest.



Floral Display

DISTRICT 9—C. A. BYAM, NEW LISKEARD

Mining and agricultural industry have experienced another year of forward expansion, with their respective increase of population and the enlargement of many towns and villages.

The prosperity and assured permanence of the newer sections of agricultural territory has had much to do with creating in the minds of all our residents that this section of Ontario was worthy of the very best efforts of a home-making and home-loving population. While no new Horticultural Societies have been organized this year, I am pleased to report that without exception all those already formed are functioning well and making a real contribution to the best in community life.

Our horticulturists have difficulties not experienced by other parts of the Province—shorter season, and in sections, industrial disadvantages, such as is found at Sudbury and other mining centres.

During the year it has been my privilege to have visited societies in all parts of the district; in some cases making an examination of gardens, judging home grounds and gardens, judging at annual shows, and at two meetings of societies gave garden talks during the evenings.

Have also been consulted regarding improvement of civic by-laws regulating and restricting domestic and other animals at large, etc.

Throughout the entire district there is an earnest desire to make the Horticultural Society a real benefit. No two appear to work along similar lines, but expend their energy where the local need is apparent. The visits of Mr. Moore to the district have worked wonders, it is hoped that arrangements will be continued whereby he may be able to spend one or two weeks yearly among the societies of District No. 9.

District 10—W. P. Bailey, Fort William

Fort Frances.—1926 has been a very successful year with this society. It was handicapped in starting the year with a financial deficit, but has overcome this and closed the year with a good bank balance. A membership of 114 is recorded, and with the rapid progress of this busy centre, a large increase is confidently expected for the coming year. A home surroundings and garden competition was one of the features, and a flower show in August at which 433 entries of particularly meritorious quality were staged. Your director was able to arrange for Mr. H. J. Moore to attend this exhibition as judge, and the officers and members of the Fort Frances society were very appreciative of his work and interest, and hope it can be arranged that he be again available.

Fort William.—In the spring of 1926 this society was fortunate in extending its membership to include a goodly number of ardent horticulturists at Kakabeka Falls, a village some twenty miles from Fort William, where is located the power plant of the Kaministiquia Power Company, Limited. The results obtained and interest created at this point can best be indicated by quoting a recent letter from Mr. P. R. Farrow.

> You were good enough to offer to take under your wing such people, resident at Kakabeka Falls, as were willing to become members of the Fort William Horticultural Society and in response to the notification twelve applications were received. The premiums were much appreciated and the gladioli distributed were especially admired. It is too early yet to give any opinion as to the roses, but we are having a favourable winter and hope to report a considerable number surviving and blooming in the coming season. The Power Company have also been good enough to allow some improvements to be made to their grounds, and we are hoping that in a year or two we may have a place worth visiting not only for the scenic value of the Falls, which is the Mecca of a large and increasing number of visitors from the United States, but round the village itself in the gardens and improvements possible under an increasing and enthusiastic number of amateur horticulturists.

The Fort William Society proper continues to extend its endeavours, providing premium stock of exceptional quality for its members and continuing to carry on the Vacant Lot Gardens branch, with the commendable result that there are few bare spaces in the city. The Flower Show, held the last week in August, had the largest number of entries yet staged, and the progress of the exhibitors in cultivation of flowers, and manner of exhibiting was clearly indicated in the quality of the different blooms shown. Mr. H. J. Moore, at the request of your director, was sent from Toronto to judge this as well as a number of other exhibitions, and gave such satisfaction that it is hoped he may be available for the 1827 show. During the year, another cup was added to our list of trophies for competition, through the kindness of Kellough Brothers, one of the city's

leading dairy firms; and Mr. Arthur Sitch, of Hymers, a pioneer nurseryman in this district, donated a cup for the best home garden and lawn, which created considerable interest in this particular feature. On every hand one sees improvement in homes, gardens, lawns and streets, the direct or indirect result of the activity of this society, and there is no doubt that the energetic officers and board, elected for 1927, will continue the good work.

PORT ARTHUR.—Your director addressed a meeting of this society in the early part of 1926, and during the summer arranged for a judge for the flower show in the person of Mr. H. J. Moore, who, besides judging the exhibition to the complete satisfaction of the officers and exhibitors, also gave an illustrated lecture on the second night of the show, and spent a lot of time with the different exhibitors explaining merits and demerits in the flowers and advising as to methods of culture. The following is the report from the secretary:

"The 1926 exhibit was very successful from the viewpoint of the high class of the flowers, roots and fruits on show; in fact, it is thought that they were better than in any other year. The number of exhibits and exhibitors were maintained and the directors and exhibitors are already planning for a more complete and expansive programme than before. The membership for 1926 was larger than ever and it is hoped that even that will show an increase in 1927.

"The directors highly appreciate having Mr. Moore as judge and express the hope that he will again be present to judge the 1927 show. His efforts and judgment were highly praiseworthy and satisfactory and particular appreciation is given to the illustrated lecture given on one of the show nights.

SAULT STE. MARIE.—In the report of 1925, the lack of a society in this city was mentioned, and it is with pleasure that announcement can be made at this time of the formation of the Sault Ste. Marie Horticultural Society in the spring of 1926, with 134 members, Mr. J. LeB. Ross being the president and Mr. J. M. MacIntosh, secretary. The secretary indicates 200 members as the ambition for 1927, and it is sincerely hoped that this society may meet with success in its ambitious programme. During the summer just past, it was our pleasure to arrange that the Soo be included in a lecture tour by Mr. H. J. Moore, and his illustrated lecture at that point had a very stimulating effect on matters pertaining to horticulture. The society held a flower show in September, reporting exceptionally good results, and carried out during the summer a programme of home beautification work.

SLATE RIVER VALLEY.—This is our one rural society in this district, newly formed in 1925. It has been fortunate in having very energetic officers, and has been highly successful as regards both members and results obtained. Your director arranged for the judging of the gardens, and of the flower and vegetable show which was held in the community hall the latter part of August; and arranged also an illustrated lecture following the exhibition which drew a good crowd of interested listeners from the whole surrounding district.

THESSALON AND ESPANOLA.—These towns were both included in Mr. Moore's lecture tour during the summer of 1926. Thessalon already has a society doing good work; and Mr. Hugh J. McNealy, town manager of Espanola, reports that following the visit of Mr. Moore considerable interest was taken in beautifying the town. 4,500 bulbs have been planted in the parks, and 1,000 or more by private parties. Continued interest is expected this coming spring when a new society may be looked for at this point.

There are other towns and villages in District No. 10 which should number horticultural societies among their public bodies. Progress has been made in at least one place, namely, Rainy River, where it is hoped that 1927 will see a society formed.

REPORT OF ST. THOMAS HORTICULTURAL SOCIETY

The Trial Plot constituted a perpetual flower show from early spring until late in the fall. The choicest variety of tulips, hyacinths, daffodils, peonies, iris, roses, perennials, gladiolus by the thousands, and closing the season of beauty with giant dahlias, hardy mums and asters. Two small indoor flower shows were held in a marquee on the grounds showing only the rarest and choicest of blooms.

Hundreds of citizens and out-of-town people enjoyed the flowers, and during the evening shows and on Sunday the garden was studded with groups of flower lovers. A large number of blossoms were distributed throughout the season to the hospital, churches, the sick, and to conventions.

It was a pleasure to give the outside public a glimpse of some of the floral beauties in the gladiolus world. It was with unbounded pride that former St. Thomasites stood in admiration and gazed at our society exhibits at the Canadian National Exhibition and at the Western Fair, Exhibitions at which only the finest stock from the world's greatest growers counts, and our exhibits in mostly every case were awarded first prize.

During the season we were favored with excellent addresses by the president of the Ontario Horticultural Association, Mr. Fred A. Kent, and by J. W. Crow, hybridist, of Simcoe. A garden competition, the first in many years, was held and though in many respects it was not ideal yet it met with hearty approval, and at the meeting for the distribution of prizes to the successful entrants, there was a large and enthusiastic crowd assembled. The proceedings were enlivened by an excellent musical programme furnished under Mr. Howard Gordon's leadership. National Garden week was observed in a fitting manner. The City Council as usual played an important part in asking for a general yard cleaning, placing the departments clear-up-squad at the disposal of the people.

Many delegations and visitors of note came to the city to see its floral beauty. Special mention should be made of the American Rose Society's officers and members, about forty in all, on their first pilgrimage to Ontario. Some of the most prominent men in America were with the party, and many letters of appreciation of the efforts of the St. Thomas Horticultural Society were received. Band concerts were given in the Trial Plot, three through the generosity of the Salvation Army Band and one by the Regimental Band, through the courtesy of the City Council. An old fashioned minstrel show was also put on by Harry Ellison and the choir of Christ Church, Port Stanley.

During the season, an all St. Thomas film was made by the Ontario Motion Picture Bureau. It depicted floral beautifications. As the venture was a new one, only partial success was achieved, but further efforts are going to be made by the Department, aiming at greater success.

Two thousand option books were printed and distributed and given out amongst the members and to many prominent Horticultural Societies, Departments of Agriculture, etc., throughout Canada.

CONTENTS

	PAGE
OFFICERS FOR 1927	2
FINANCIAL STATEMENT	2
ONTARIO HORTICULTURAL CONVENTION	3
President's Address: J. E. CARTER	3
Report of Superintendent: J. LOCKIE WILSON	6
Care of House Plants: WM. ALLAN	16
Value of Evergreens for landscape effects: A. H. TOMLINSON	18
Gardens of England in 1926: REV. G. W. TEBBS	20
Culture of Roses: H. J. MOORE	22
Hybridizing for Amateurs: J. W. CROW	25
Address: HON. J. S. MARTIN	32
Address: REV. CANON CODY	35
Report of Horticultural Council: J. E. CARTER	39
Canadian Grown Nursery Stock: C. K. BAILLIE	42
Inspection of Nursery Stock: ARTHUR GIBSON	45
Discussion of Regulations dealing with Importation of Plants: L. S. MCLAINE	47
Diseases of the Gladiolus: F. L. DRAYTON	49
Eyesores Give Way to Beauty Spots: W. H. PORTER	56
Floral Arrangements and Table Decorations: MISS M. GALBRAITHE	60
Report of Juvenile Horticultural Work for 1926: R. R. GRAHAM	62
Report of Committee on Names and Varieties: W. T. MACOUN	66
Some of the Newer Roses: MISS PRESTON	68
Questions and Answers	69
Reports of District Directors	71

Ontario Department of Agriculture

TWENTY-SIXTH ANNUAL REPORT

OF

THE AGRICULTURAL SOCIETIES

AND OF THE CONVENTION OF THE

ASSOCIATION OF FAIRS AND EXHIBITIONS

FOR THE YEAR

1926

PRINTED BY ORDER OF
HON. J. S. MARTIN, Minister of Agriculture

ONTARIO

TORONTO
Printed by Clarkson W. James, Printer to the King's Most Excellent Majesty
1926

CONTENTS

PAGE

OFFICERS FOR 1926 3

TREASURER'S REPORT 3

ANNUAL CONVENTION 5

President's Address: JAS. MCLEAN 5

Report of Superintendent: J. LOCKIE WILSON 6

The Amusement Tax in Relation to Agricultural Societies: WM. ORR 15

Co-ordination of Agricultural Societies and School Fairs: A. E. CULVER 19

Address: HON. JOHN S. MARTIN 22

Classification of Horses: WM. DOHERTY 30

Preparing a Fall Fair Budget: JUSTUS MILLER 31

Amalgamation of Small Fairs: W. P. MACDONALD 35

Necessity of Seed Cleaning Plants and Revision of Grain Prize Lists: E. K. HAMPSON 39

Advertising Fall Fairs: A. R. G. SMITH 42

Fair's Policy in Relation to Live Stock Development: H. S. ARKELL 43

How the Women's Institutes Can Co-operate with Fair Boards: MISS E. M. CHAPMAN 49

Report of Resolutions' Committee 53

Reports of District Directors 55

Suggested Classification for Prize Lists for Township Fairs 66

CUTS FOR PRIZE LISTS 71-78

ONTARIO ASSOCIATION OF FAIRS AND EXHIBITIONS

OFFICERS, 1926

Officers

Honorary President	A. J. H. ECKARDT, Toronto.
President	DR. A. T. MORROW, Maxville.
1st Vice-President	CHAS. WHITE, Emsdale.
2nd Vice-President	JOHN McLEAN, Rodney.
Secretary and Editor	J. LOCKIE WILSON, Toronto.
Treasurer	J. S. PEART, Hamilton.

Directors

Honorary Director	JAS. McLEAN, Richmond Hill.
District No. 1	J. F. AULT, Winchester.
" " 2	P. McCALLUM, Almonte.
" " 3	J. N. STONE, Campbellford.
" " 4	ISAAC NAYLOR, Fenelon Falls
" " 5	GEO. FOSTER, Shelburne.
" " 6	J. A. TUFFORD, Beamsville, R.R. 1.
" " 7	A. E. CULVER, Simcoe.
" " 8	JAS. A. STEPHENS, St. Marys, R.R. 1.
" " 9	M. S. SCOTT, Highgate.
" " 10	A. C. REID, Teeswater.
" " 11	G. W. MILLER, Gravenhurst.
" " 12	LEONARD DREANY, North Bay; CHAS. R. B. HILL, Murillo; F. C. WAGG, Mindemoya.

Representatives

Central Canada Exhibition	J. F. AULT, Winchester.
Western Fair	C. W. MOLLAND, Thorndale.
Royal Agricultural Winter Fair	L. J. C. BULL, Brampton; JAS. McLEAN, Richmond Hill; DR. A. T. MORROW, Maxville.

FINANCIAL STATEMENT, 1925

Receipts

Balance from 1924	$567 90
Three hundred and seven membership fees at $2.00	614 00
One membership fee at $1.00	1 00
Exchange added to cheques	4 55
Interest	12 00
	$1,199 45

Expenditure

Perth Print	$39 00	Meals for directors	$7 94
Badges	16 60	Directors expenses attending fairs and meetings	172 20
Stationery	14 70	Auditing	5 00
Treasurer's bond	5 00	Typewriting	2 50
Floral tribute to the late Mrs. J. Lockie Wilson	25 00	Exchange on cheques	13 20
Present to retiring President, Mr. A. R. G. Smith	6 00	Postage	9 50
Banquet expenses	96 25	Miscellaneous	30
Assistants at Convention, 1925-26	105 00	Balance on hand	441 26
Honorarium to Secretary	200 00		$1,199 45
Honorarium to Treasurer	40 00		

J. E. PEART,
Treasurer.

ONTARIO ASSOCIATION OF FAIRS AND EXHIBITIONS

ANNUAL CONVENTION

The twenty-sixth annual convention of the Ontario Association of Fairs and Exhibitions was held in the King Edward Hotel, Toronto, on Wednesday and Thursday, February 3rd and 4th, 1926, with Mr. James MacLean, Richmond Hill, the President of the Association, in the Chair. Mr. J. E. Peart, Hamilton, the Treasurer of the Association, read his report, which was adopted. Committees were appointed as follows:—

Resolutions: Messrs. J. T. Hunter, Dr. A. T. Morrow, S. B. Carey.
Nominating: Messrs. C. W. Mullen, J. F. Ault and A. R. G. Smith.
Question Box: Messrs. J. L. Wilson, P. Stewart and R. E. Cowan of Galt.

His Worship Mayor Foster then gave an address of welcome.

PRESIDENT'S ADDRESS

JAS. MCLEAN, RICHMOND HILL, ONT.

Ladies and Gentlemen: I extend to you a most cordial welcome to the 26th Annual Convention of the Ontario Association of Fairs and Exhibitions. Over a quarter of a century has come and gone since you became organized as the clearing house of the 360 Agricultural Societies in the Province. Looking back over the history of our Association, I note the high character and enthusiasm of the Boards of Directors you have elected from time to time, and I consider it a very high honour to preside over this, the most important organization in the Dominion of Canada. The Fairs and Exhibitions of Ontario are the places where farmers, manufacturers, merchants, professional men and all classes of our citizens come together for a common purpose, come together to look into the mirror which shows the marvellous advancement that is taking place in all that tends to make a country great. The farmer with his live stock and produce, the manufacturer with his products, and the up-to-date merchant who displays his wares thereat all engaged in friendly rivalry, all interested in displaying the results of their industries at their best, comprise a panoramic view—a view that shows the results of the industrial citizenship of Ontario that makes her proud of her sons and a joy in the work they have in hand.

At the great Industrial Shows in the United States, Canada's cattle, horses, sheep and swine stand in the forefront and prove to the world that Ontario is and will continue to be the great breeding ground for the finest live stock produced in the world. Much favourable comment has been made of World's Fairs held in different countries, but it is no vain boasting to say that the two outstanding fairs in Ontario, the Canadian National Exhibition and (if you will pardon me) the greater Royal Winter Fair are not equalled in any other land. It is a matter of congratulation to the Boards of Directors of our 360 Fairs that though last year at some Fairs exhibits were somewhat lighter than usual, yet the quality was never excelled. And, after all, that is as it should be, and in the last analysis it is quality not quantity that counts.

I am pleased to note that there is no falling off in the attendance at our great Conventions, and I know that the delegates here assembled will carefully consider the problems and the suggestions for improvement that may be made, and you know there must be no slipping backward and no standing as you were, but "onward and upward" must be written large over the gates of every fair in Ontario.

You will be asked to consider the advisability of amalgamating smaller fairs with larger ones in counties, and there is an item on the programme where this will be brought to your attention.

Another important matter that will come before you is the co-ördination of Agricultural Societies and School Fairs. This will, no doubt, receive your serious consideration, as it deeply concerns the farmers of this Province. In Ontario the live stock industry is one of the most important, and the harvesting of corn and root crops has got to be attended to promptly owing to the shortness of the season, and the holding of 360 fairs and 400 odd school fairs is, perhaps, beyond the unlimited energy of the average farmer.

The judging system adopted by the Ontario Department of Agriculture is meeting with the approval of the Boards of Directors, and the work of the judges on the whole has been satisfactory. Doubtless errors in judgment have been made, but it is said by those who know whereof they speak that the man who never made a mistake never made anything.

From time to time Judges in the High Courts of this Country are continually having their decisions reversed, so it will always be, even with the expert at our Exhibitions.

The Standing Field Crop Competitions inaugurated some 18 years ago by your Superintendent were one of the many steps taken by our Societies, and the Fair Boards to-day that are not holding these competitions are not, in my opinion, up-to-date. It is true that it involves some extra work on the part of the Secretary, but it is work that counts. The procuring, first class seed and the sowing and harvesting carefully will bring much wealth not only to the farmer himself but to the whole Province. If a farmer sows mongrel seed he will reap a mongrel crop. The lack of up-to-date seed cleaning plants and proper grading of grain, grass seeds and potatoes has been a great detriment to our Agriculturists, and I am sure you will be glad to know that steps are being taken by the Ontario Department of Agriculture and the Ontario Field Crop and Seed Growers' Association to remedy this situation.

I know that at the close of this Convention, with the deliberation that you are accustomed to giving to important questions that arise from time to time, you will go back to your Societies filled with enthusiasm engendered by contact and exchange of views with kindred spirits who are all interested in the work you have in hand.

REPORT OF THE SUPERINTENDENT

J. Lockie Wilson, Toronto

We have just entered the second quarter century of our existence under the name of the Ontario Association of Fairs and Exhibitions. The year just closed marks an epoch of progress and advancement in all the lines of our endeavour. As a rule, the fairs held in 1925 showed marked improvement in nearly all classes. Where there was a slight falling off in quantity, the quality was of a higher standard, and as your President has stated, it is quality that

counts. Owing to the large number of automobiles in use by your patrons, larger parking spaces are necessary at nearly every fair in the Province. In view of the fact that automobiles have largely taken the place of horse-drawn vehicles, particularly where one and two day fairs are held, judging should be completed in the main halls not later than noon so that they can be opened promptly after lunch hour, instead of keeping the halls closed till nearly 3 o'clock in the afternoon and, in some instances exhibitors begin to move their stuff about 4.30, which does not leave enough time for visitors to see and compare the merits of exhibits. The same should also apply to classes of live stock where doubtless many are interested in watching the stock judging, and can note the time during which it takes place. I am sure you will agree with me that this new suggested departure will add materially to the success of your fairs.

There should be ample assistance given to lady judges in the Main Hall, particularly in the canned fruit department, where there are sometimes scores of cans to be opened. Much time is lost if the judges are required to do this.

I am pleased to notice the very great improvement in the prize lists of several Exhibitions. Better paper, better cuts and better printing are in evidence. The appearance of a prize list has a great deal to do with inducing stock men and others to exhibit at fairs. There are, however, some societies which have not yet taken any steps in rearranging and improving their prize lists and are content to remain in the old rut, using cuts of a type which were made twenty or thirty years ago. Their appearance has a tendency to deter many from exhibiting. Good cuts can be purchased reasonably and will justify the expenditure involved. One thing must be borne in mind and that is to see that the cuts used are those of up-to-date types of animals or products. For instance, use in the swine department cuts of animals that are of the bacon type. In the poultry section, they should be of birds of the utilitarian class. The majority of the Agricultural Societies have had the sections of their prize lists covering Ladies' Work, Fine Arts, Domestic Science, Dairy Products and kindred classes revised by experts to the general satisfaction of all concerned. Those who have not had their prize lists revised can have this done if they forward them to me. Directors, of course, need not use the whole revised lists unless they so desire. There is, however, room for improvement in other departments of the prize lists and this should receive the serious consideration of your Boards. It is desirable that the Directors of an Agricultural Society meet shortly after the exhibition has closed, and while the mistakes that occurred at same and suggested improvements are fresh in their minds, and go carefully over the prize list from beginning to end and make such changes and additions as are found by experience to be necessary. The matter of special prizes can be left to a later date, the main list should be definitely settled as early in the year as possible. Such a revision, if intelligently carried out, cannot fail to result in a greatly improved exhibition the following year.

During the time succeeding the Great War, as a general rule, heavy horses were more numerous at Fairs and Exhibitions than the light breeds. This rule seems to have been reversed during the year past and light horses have predominated over the heavy at some of the larger exhibitions. The falling off in the latter is due to fewer animals being imported. It is very satisfactory to note that in some cases Canadian-bred heavy horses have been of such excellence that they have won over imported stock. If we had more females such as are to be found in Great Britain, these bred to stallions of an outstanding type would render importations less necessary and their offspring could be readily and profitably disposed of at a price below what such animals could be imported for.

There should be a rule in every prize list barring stallions from competing against mares and geldings in carriage classes.

Applications were received by me from Fair Boards in the Province for judges for 1,200 classes. It required seven hundred Judges to complete this large order. Of the 360 Fairs in the Province over 250 employed Departmental judges.

We are having considerable difficulty with Fair Boards who, after the judges have been appointed and the circuits arranged and the dates advertised in our lists, decide to change them, and by so doing disarrange our circuits. During 1925, Societies in the Province to the number of 30, after their dates were advertised, decided to make a change, evidently not understanding the trouble

Dr. A. T. Morrow, President.

we are having in getting newspapers to print the revised lists, which in many cases is not done. All Fair dates should be definitely decided on so as to reach me not later than May 1st.

Delegates will please bring to the attention of their Societies that the expenses of Judges employed other than Departmental can be counted in as expenditure for agricultural purposes in the financial statement and affidavit.

Through the urgent request of your Association, a grant was placed in the estimates a number of years ago to be apportioned among Societies which suffered loss in gate receipts through bad weather conditions. If your Association had accomplished nothing more than this it would have justified its existence. The full $10,000 was required to assist in meeting the losses in gate receipts experienced during 1925.

FIELD CROP COMPETITIONS

The work of the Standing Field Crop and Combined Competitions is being extended and they are now being held in every County and District in Ontario except Haliburton, Lennox, Addington and Stormont. In 1925 the number of crops judged were 286.

The rules and regulations provide that no farmer can enter in more than one Society; this rule is absolute.

In some instances in the past secretaries have filled in on the individual forms sent them by the Department, the names of those who wished to enter the Field Crop Competitions instead of having each one sign his own entry. And not only has this been done, but, occasionally, secretaries have signed the names of farmers who had not given them authority to do this, and when the judge called at these men's farms he was told that they had not entered in the competitions. There has been a good deal of needless expense to the Department in this connection, and, in future, each competitor must fill in his own form and sign it, being careful to state on it the variety of grain, potatoes or grasses that he is entering, as non-standard varieties of grain are subject to a deduction of 2 points and potatoes 5 points. In future, no list of entries will be accepted by the Department if filled in by secretaries; as already stated, the entry form must be filled in and signed by the farmer himself.

Regular notice of motion has been received to the effect that the Constitution of our Association be amended by making the term of Directors 2 years instead of one. This I consider a move in the right direction as one year is too short a time for a Director to do his best work.

Another notice of motion has been received proposing that a resolution be passed asking the Ontario Legislature to amend the Agricultural Societies' Act by making the maximum grant $500 instead of $800. For the information of your delegates there are nine Societies out of the 360 which receive the maximum grant of $800 and, in addition, only 20 Societies received a grant exceeding $500.

Acting under instructions, on August 21st, 1926, I sent to the secretaries of Agricultural Societies in the Province the following letter:

"In reply to numerous inquiries which have been received in regard to GAMBLING DEVICES at Fall Fairs, I beg to call your attention to subsection 2 of section 32 of The Agricultural Societies Act (Chap. 47, R.S.O. 1914), which reads as follows:

> "The Officers of the Society shall prevent all immoral or indecent shows and all kinds of gambling and all games of chance, including wheels of fortune, dice games, pools, coin tables, draw lotteries or other illegal games at the place of holding the exhibition or fair, or within 300 yards thereof, AND ANY ASSOCIATION OR SOCIETY PERMITTING THE SAME SHALL FORFEIT ALL CLAIM TO ANY LEGISLATIVE GRANT DURING THE YEAR NEXT ENSUING."

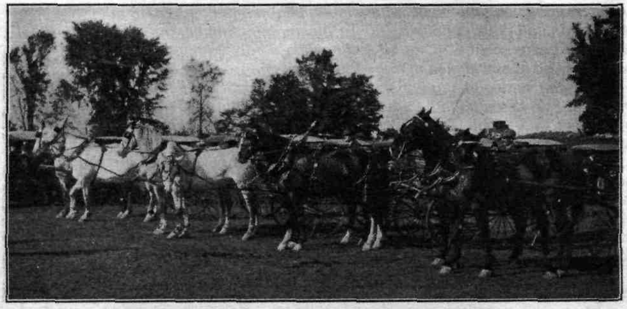
" I am instructed to advise you that this section will be strictly enforced, and I trust we may count on your co-operation to see that no violations are permitted in connection with the Fair in your charge."

Complaints have reached the Department that, notwithstanding the warning given, some Societies have failed to comply with the Department's request. The reported actions of these Societies are now being investigated. For nearly 20 years we have worked together for the freeing of our fairs from blacklegs and gamblers, and I cannot understand the mentality of Fair Boards which allow

their patrons to be robbed for the sake of the few paltry dollars they receive from men who are too lazy to work for an honest living, and whom they are encouraging to operate their thieving devices among unsuspecting farm lads, who receive their first gambling lesson through the anxiety of Directors to fill their coffers with illegal gain. In looking into your faces I know that the fairs held in 1926 will be freed from this incubus, the only tendency of which is evil.

Standardization of Farm Machinery

On many occasions at your Conventions you have discussed this economic farm question, and it has been proved to the satisfaction of your delegates that there would be a great saving to purchasers of farm machinery if your government was wise enough to do, as has been done in many other lines, by the standardization of breakable, wearable parts of your machines. In the manufacture of nearly all types of plumbing supplies, standardization has prevailed; electrical



Judging general purpose teams at Chatsworth.

and automobile supplies have also come under the beneficent idea of standardization. At a number of our Conventions, resolutions were passed unanimously from time to time and forwarded to the different governments in power at Ottawa requesting that the breakable, wearable parts of farm machinery be standardized. After postponement from time to time, the matter was taken up by the Agricultural Committee of the House of Commons on December 27th, 1919, and a report was brought in favourable to your request, and farmers and manufacturers were given the opportunity of expressing their ideas pro and con. The consensus of opinion seemed to be that it is of vital importance that this matter should be dealt with promptly. Those in favour of the proposition made it clear that legislation should be passed making operative a law that manufacturers should standardize specified lines of breakable, wearable parts of farm machinery.

In the earlier stages of plows, for instance, a point made by one manufacturer would fit any plow of another make. Later, the bolt holes and bolts were changed so that the purchaser was obliged to get the breakable, wearable parts

of such implements from that particular manufacturer during the life of such implements. In the standardization of wagon skeins, nuts, bolts, wheels and poles, etc., there is room for a great saving by standardization.

It is claimed by certain manufacturers that standardization would destroy inventive genius. This is not so, as it would not discourage invention but would be an incentive to it, and standards could be improved and adopted from time to time. Mowers and binders, knives and cutting bars, etc., could be of uniform type. Since 1919, so far as I am aware, the report of the committee has been placed in a pigeon hole and there it rests. Now that we have a farmer bloc at Ottawa that is said to be a controlling force, doubtless, if you pass a strong resolution and have it forwarded to the leaders of the several parties at Ottawa, you may have this report withdrawn from its musty archives and action taken thereon.

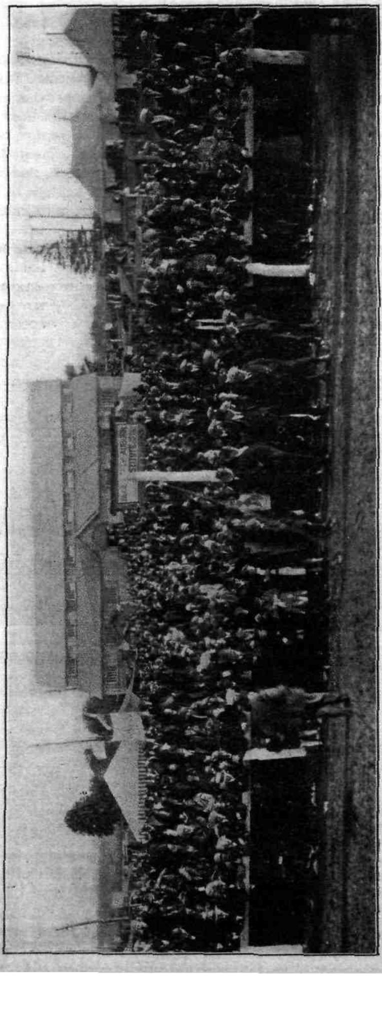
The Co-ordination of Agricultural Societies and School Fairs will be dealt with by the Hon. John S. Martin, Minister of Agriculture. This is one of the most important questions that will come before the Convention and will, I know, receive your most careful consideration. There are about 350 Fairs held annually and over 400 School Fairs, all carried on between the 1st of September and the 15th of October, which is the busiest season of the year for Ontario farmers, all crowded into the very short space of 45 days. This does not include the Canadian National, Central Canada and Western Fair, which are carried on in the period above mentioned.

Another proposition which will be placed before you is for the amalgamation of the smaller fairs in the counties, which will, doubtless, create considerable discussion.

In 1906, I had the honour of being introduced to you as Superintendent of Agricultural Societies. During the twenty years we have worked together, in no single instance has there been the shade of a shadow of friction at the twenty Conventions which I and many of you have attended, and I may say without fear of successful contradiction, that no finer body of men and women foregather in the City of Toronto than these into whose faces I am looking to-day, and I trust that in the incoming years we may all be spared to continue to further the interests of our great institution with the same enthusiasm and energy that you have ever shown in the past in the work we all have at heart.

JNO. GARDHOUSE, Weston: I want to bring a matter before this meeting which has been talked over with the Stallion Enrolment Board and Mr. Wade. There is a grant made by the Provincial Government for premium stallions in the Province of Ontario, and it is difficult for that Board to arrive at the proper list for premium stallions. It has been considered by the Board and discussed with your able Superintendent that the secretaries of the various Fair Boards in the Province supply a list of all the foals two year olds and three year olds shown at Exhibitions and the names of their sires at the time the entry is made, so that the Stallion Enrolment Board may have something definite in order to find out where the good useful stallions of the Province are and thus arrange the premiums for the stallions in the Province of Ontario.

MR. HILL, Murillo: With regard to the standardization of wearable and breakable parts of farm machinery, we have in the Province of Ontario 360 Agricultural Societies. Let us pass again as strong a resolution as we can along the lines previously followed. Let a number of copies of this resolution be sent on to every secretary of these societies, get their members' names on these sheets and return to Mr. Wilson. Let every secretary and every director of every



Waiting for the stock parade, Paris Fair.

Society here to-day pledge themselves to go after every farmer in the district to sign that, to let them know that we are not only passing resolutions, but that we mean it.

W. S. West, Woodstock: We have listened to an address this afternoon from both the President and Superintendent of which we may all be proud. Mr. Lockie Wilson has been our superintendent now for twenty years, that is a pretty good record.

Mr. Wilson referred to the Field Crop Competitions and to secretaries signing the applications. That is absolutely wrong. I generally at the annual meeting have my applications there and get every farmer at that meeting to sign his application. I also send out about a dozen application forms with the farmers who are at the meeting. They take them out to other farmers and when it comes time to send them in to the secretary, I have them ready.

With regard to the appointment of directors for two years; that is a splendid idea. But I would like to have seen taken up the matter of making more district directors. There is hardly a district but has had between 30 and 40 fairs in it. No district representative can do justice to them. A representative costs us $10. How much better it would be to add six more representatives, it would be a matter of $60.

The next matter is the question of cutting down the grants of the larger Fairs. We are one of the twenty fairs which gets over $500, but it is just as hard for the small fair to run their fair as it is for the larger fair to run theirs. Our Government grant last year was only $587. We are only too willing to hand over that $87 if it is going to assist some of the smaller fairs.

Re gambling devices: It is one of those things for which our own local board has taken responsibility. The Superintendent can not do it. It is up to us to keep our individual fairs clean. We alone can, and should do it. I am afraid we that have races at fairs are all gambling. Our races are run under the Trotting Association and that is not trials of speed, but I have my doubts of anyone going after us unless you have an enemy in the camp, and then of course the Department would have to go after us.

In reply to a question the Chairman replied that the cities were represented on Fair Boards. The directors are elected from a certain district, whether they be city or country men. The best men are elected.

C. A. Dewey, Renfrew: I am in very great sympathy with the small fair. I represent a fair that was very small at one time and we took what was coming to us and were glad to get it and by hard work and persistent endeavour we have been a benefit to the community. We get $800, and don't get a dollar too much, and get it because we deserve it.

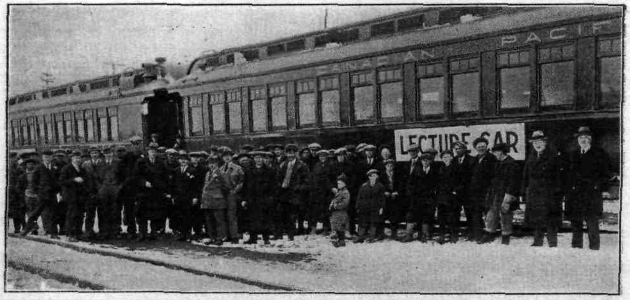
I know small fairs that are represented here to-day which get $1,000 from the Township; we don't get a nickle. I object to any part of the grant being taken.

A. R. G. Smith, New Hamburg: There are several things that are mentioned in the reports of the President and Superinrendent that are worthy of serious consideration by the delegates who return to their agricultural societies to give a report.

I have always taken the stand that the small agricultural society even though it is not handing out very large amounts of money in prizes is doing a splendid work in connection with the Field Crop Competitions.

I would like to also have some clearing up of the gambling device. I would like to ask if that which is considered right by the Dominion Government is also considered right by the Provincial Government, so that those who attend to our games at our fairs will be able to give a definite reply as to what in their opinion and in the opinion of the Dominion Government is a legal game. I have been at the Toronto Exhibition on various occasions and I was not conscience stricken when our own fair had the same apparatus at its fair as they had in Toronto.

F. RILANCE, Beaverton: Representing some of the smaller fairs, I like the tone of the discussion which has come along so far and particularly the remarks of Mr. West, who said he would be quite willing to forego the amount over $500 which his fair is now getting. A certain fair in a city gets a Dominion Government grant of $2,062. They get a Provincial grant of $800. In addition they get a grant from the county of $500, making a total of $3,362, and they pay in prizes $6,072—very little more than half their grants. They had gate receipts last year of $11,862. Will any person say that those larger fairs are more in need of an $800 grant—could they not forego $300 for the good of the 300 other societies. I am here to support the proposal of making the maximum grant of $500 instead of $800. The fair I refer to above is the Peterboro Fair.



Seed cleaning demonstration train—Ontario Department of Agriculture.

Mr. VANCE, Milton: When a man says that a farmer coming off the farm to exhibit at the small fair on a $1 or $2 prize, had better stay at home and work, we know that man is a city man. A man never left the farm and showed an animal, even if he only got a 50 cent prize, but made money on it. I showed at eight years old at Toronto Exhibition and I won the first prize. I have never shown at any other Exhibition bigger than Peterboro. We have shown at the smaller fairs where $1 was the first prize and 50c the second, and we have sold our stock all the way to Portage la Prairie and all the way through the United States, and we got that advertisement through the little one horse fair. I am not asking you to reduce anybody's grant. I say every dollar given a fair is money well spent. I was asked to ask Mr. Lockie Wilson why the Toronto Exhibition gets such a big grant. Now that man who asked me to put that question does not stop for a minute to think what Toronto Exhibition means to the Province and to the Dominion. It is the largest advertisement that the Dominion of Canada has to-day.

THE AMUSEMENT TAX IN RELATION TO AGRICULTURAL SOCIETIES

WM. ORR, TORONTO

I am extremely grateful for the invitation to be here to-day. You know anyone who has the job of collecting taxes is extremely unpopular.

The first tax that does not affect the fall fair very much is the amusement tax. I wish you to take back to the different communities what I say, so that you will have the necessary information when any other society in your community wants to know something about the collection of that tax. The amusement tax was placed on the Statute Books in 1916. It is based on the two main principles of taxation—that is, a person's ability to pay, and equality.

Now the tax is based on the person's ability to pay, in that if they can spend money on amusements that money is coming out of their surplus income. The equality is this way: If you spend a small amount on amusements you pay a small tax, whereas if you spend a large amount on amusements you pay a larger amount.

The Department must collect that tax equally from every person in the Province of Ontario.

In the larger municipalities there are a great many more entertainments than in the smaller ones. In most cases the Fall Fair and Women's Institutes and Ladies' Aid are granted exemption in their entertainments by the Department, with the result that the Department does not get any tax from these during the year. The endeavour of the Department is to collect taxes equally from people who spend money on entertainment.

The different organizations throughout the Province have the idea that they are exempt from the amusement tax. I would like to state here that there is nobody exempt. The tax applies to everybody. The Provincial Treasurer may grant exemption; he does not have to. He does not grant that exemption unless you apply for it, and in applying don't blame the Department if you are refused if you only send them a short line and state you want exemption and you don't say what it is for.

Page 42 of the Act states very implicitly that exemption may be granted for any fair or exhibition given any society organized under the Agricultural Societies Act, provided that application for exemption is made ten days previous to the date of the entertainment.

I might state that in reference to a fall fair, an estimate of receipts and expenditures is not required.

Then it requires that the major portion of the total receipts be devoted to the cause for which the entertainment is held, no person or persons receives any remuneration for their services.

In reference to a fall fair, if the Minister carries out the policy he adopted last year, fall fairs will be granted exemption for their fairs at fall fair dates as given to the Department. The trouble has been the fall fairs wanted to run horse races. These are not a fall fair. If an Agricultural Society wishes to have a horse race they are just as much entitled to pay the tax as the people attending a horse race in Toronto.

The granting of exemption to an organization does not affect them financially in any way. The Act provides that the tax shall be collected from the people attending the fair in addition to the admission fee. The reason for granting exemptions at all is that, in the first place, a number of churches put on entertainments and charged $1. The people go to it, and they get about 25c worth of

entertainment; then the way the Government look upon it is that if a man is willing to attend an entertainment and pay that extra 75c for charity, the Government was willing to remit the tax. Now it has come to the point where people think they are automatically exempt when they are not.

I will tell you why the Department are asking fall fairs to apply for exemption. A number of fall fairs advertise they are going to hold a race meet on such and such a date. It is not a race meet at all; it is their fall fair. But how is the Department going to know that? We have a file in every locality and the Inspector reports there was no tax paid; whereas if you apply for your exemption that is noted and it is all squared. You must get your exemption previous to holding the entertainment. The fall fairs will be granted exemption for their fall fair dates.

I have a memo. here to-day that came in to the Department on January 19th. It is a resolution moved at one of the fall fairs, that as the work of the agricultural fair was for the benefit of agriculture, all duly organized societies should not come under the regulations of the amusement tax so far as fairs and exhibitions and concerts held were concerned. The only thing I can say is that the Society that passed that resolution has never been in touch with the Department.

With reference to the concert in the evening; a number of fall fairs can hold their concerts on their grounds; others of the small agricultural societies have not got that accommodation and they hold that up in the town hall or in some theatre. The Department has always ruled that a concert held on the fall fair date is part of the fall fair and there is no tax on that.

The reason for people being refused an exemption that they are entitled to under the Act is because they do not give the Department the information required. Any organization writing must give definite facts, where the entertainment is to be held, the date of the entertainment, who is going to put it on—here is an instance: Total receipts of concert, $150. Rent of hall, $6. Concert Company, $85. Now the Department claim that was not for the fall fair, that concert was held for the concert company. Remember that when you hold an entertainment on a percentage basis, the Department will not grant exemption. You may get exemption a first time, the next time this Society applies for exemption it will be turned down. It is not our fault. It is their own, as they applied for exemption guaranteeing that the major portion of the receipts go to their fair. That is not so; it went to the Concert Company. We realize in the smaller places it is hard to put on an entertainment and the Act requires that no person shall receive remuneration, but if a church puts on an entertainment and they do pay out a small amount for talent, as long as they have the major portion, that is over 50 per cent. for the benefit of their cause, the Department will not question their expenditures.

There is another tax that the fall fairs are all running into, and that is the Corporation Tax Act, which requires that anybody who holds a trotting meet must have a Provincial license of $10 per day before they open. There is absolutely no clause in that Act which permits the Minister or anyone else to exempt that organization. The Minister of Agriculture has ruled that where trotting and pacing races are held in connection with a fall fair they are trials of speed. That is on your fall fair dates only. But when an Agricultural Society puts on a trotting meet on any other but their fall fair dates, they must take out their license and comply the same as any other race tracks.

There is another thing that the secretaries of fall fairs are going to have trouble with, and that is the Travelling Show Act. The Travelling Show Act provides that every travelling show must have a Provincial license. Last year

the Department endeavoured to collect this license from a number, especially from the American companies coming into fall fairs, and we found out that these travelling companies had contracted with the Agricultural Society to show their fall fair at so much money, and that the Agricultural Society was to pay the license fee.

Section 12 of the Travelling Show Act distinctly states that any contract drawn up by any organization agreeing to pay the license fee for any travelling show company is null and void. It is absolutely illegal. In drawing up your contracts, you cannot contract to pay the license fee. So I would ask you to remember that and leave it to the Department and we will get the license fee out of the Travelling Show people.

MR. ROONEY: We got notice last year that if we had a carnival, the carnival had to pay a license and the Agricultural Society also. We also got notice that after this we would not be exempt from the amusement tax.

WM. ORR: The Department circularized every fall fair that they must apply for amusement tax exemption, and that also the travelling carnival company must pay a license fee. What we object to is the Agricultural Society paying that license. We don't want to tax the Agricultural Society but we do want to tax these American carnival companies who come in and take money out of Canada.

W. WEST: Before any Agricultural Society can hold a concert, they must have this license?

WM. ORR: This will be under the Theatre and Cinematograph Act, which provides that no entertainments can be held in any public hall (definition of public hall shall mean any place or building to which an admission fee is charged, or where a fee is collected, etc.) uness a license fee has been paid.

You can readily see where you hold a ball game under this definition that a ball ground is a public hall. The Act provides that every public hall in the province must have a license. The fee in a small municipality is $3, and in the larger municipality $10 a year.

In administering any Act you have to use a little bit of common sense. The policy of the Department is where entertainments are held in a hall, they only permit entertainments to be held that have secured exemptions for amusement tax previous to holding the entertainment. We do not ask them to have a public hall license. You may be holding ten entertainments a month, but if every one of them were granted exemption of amusement tax, before holding it, we do not ask for license. The Society may let their hall out. We do not ask a hall which only holds two or three entertainments a year to take out a public hall license. The reason for licensing public halls is to hold the public hall for the collection of the amusement tax. The person having that hall is responsible for collection of the amusement tax unless the person holding the entertainment shows a letter from the Department that they are exempt from the amusement tax. The licensee is also responsible for a monthly return form showing the entertainments held and the number of people from whom taxes were collected and also the series numbers of amusement tickets used.

Now there are a number of halls throughout the Province only holding one or two entertainments a month. If those smaller halls would apply to the Department, I have no doubt they would be granted permission to dispense with the amusement tax provided they forwarded tax collected in reasonable time.

MR. HUNTER: We own a hall for which we have a license. Then we have an athletic field. Ball games are often played. Will the one license cover the two?

WM. ORR: If the hall is situated on the fair grounds and you will notify the Department of that, one license is sufficient.

JAS. MCLEAN: In the case of an agricultural hall on the fair grounds rented as a skating rink, who is liable for tax—the people who rent the hall or the Society?

WM. ORR: The person who takes out the license. The Department does not collect a tax from a person attending a skating rink for skating only; therefore the Department does not demand that such a rink take out a public license; but where they hold carnivals or charge admission to hockey matches, they must collect the tax. If they only hold one or two of those hockey matches we don't want the license, but if they hold five or six we demand a license from the person operating the skating rink. If the Agricultural Society does not make the person operating that rink take out that license, the Agricultural Society would be liable as the owner.

J. J. HUNTER: On the night of a concert, our Agricultural Society has not a building on the ground sufficiently equipped. We use the town hall that night. We do not have to make application to you for remission of the tax, do we?

WM. ORR: Every entertainment is taxable, whether fall fair or any other organization, unless you have a letter granting exemption. In the handling of these exemptions, in order to keep our accounting straight and for the auditors, the Department was compelled to have every church and every charitable organization apply for amusement tax. If the Minister is willing to remit certain of the public taxes, surely the agricultural executives can sit down and make application for exemption. My friend is worrying about the concert held the evening of the agricultural fair. As I stated before, the Department treated that concert as part of the fall fair even if not on the grounds, but when making application you want to notify the Department where the concert is going to be held. All our accounts are held against certain places, and the two must tally.

The Province of Ontario covers a large space of ground, and as I stated before, previous to June a year ago, the Act granted that churches automatically were exempted from amusement tax without applying for the same. I will tell you why it was changed. Up and down the country we had churches contracting with American concert companies to come in and put entertainments on at their churches under the auspices of their churches on a 60 per cent. basis to the concert company, 40 per cent. to the church, the church paying all expenses and refusing to pay amusement tax. We had the agricultural societies doing the same thing. We have had churches and Agricultural Societies holding horse races and claiming it is exempt because it was a religious entertainment.

DR. MORROW: In making the reports from the small societies for football games held, and then nothing all winter, we don't mind so much making the reports as we do running around for a magistrate to take the affidavit.

WM. ORR: A number of the Agricultural Societies holding licenses for public games object to filing that in that return and taking the affidavit to cover it all winter. If the secretary of an Agricultural Society will write saying, "This park will be definitely closed on such and such a date for all year," that is all we ask.

Here is another thing I would like to tell you; in a number of smaller rural places in the Province it is an extremely hard thing to get an affidavit taken. Now whenever you send a return in with nothing on, the Department does not

ask for an affidavit, and if there is a small place where it is hard to get the affidavit taken, the Department will accept their statement without affidavit if they keep within the Act.

Mr. Stock: Belleville: Is the amusement tax imposed from a righteous standpoint or is it a revenue?

Wm. Orr: The Theatre and Cinemetograph Act was passed to control the theatres throughout the Province. Under that Act the public halls are licensed purely for the control of them; the amusement tax act is purely for revenue. If you will write to the Department and ask for exemption, that is the only tax that you are liable for. The Amusement Tax does not apply unless the patrons pay admission. If they are admitted free there is no tax, or if a voluntary collection is taken there is no tax. If you make it a silver collection, the tax applies.

CO-ORDINATION OF AGRICULTURAL SOCIETIES AND SCHOOL FAIRS

A. E. Culver, Simcoe.

We are continually hearing the statement that we are over-organized. This applies to many other interests than our fairs.

The number of fall fairs have been referred to by our President and our Superintendent in their addresses. There are held annually 360 fall fairs and 425 school fairs, a total of 785 fairs, leaving out the Canadian National, Ottawa and London. Only 25 school fairs are held in connection with fall fairs. We must remember that these 725 fairs are all held within the short period of six weeks, as every one knows by far the busiest season of the year. Is it not reasonable to expect that someone will suggest the co-ordination of a large number of these, so that time and energy might not be wasted in so much duplication of exhibits?

In our County of Norfolk most of the school fairs are held in connection with the fall fairs of the township they represent—and in three or four cases have transformed weak struggling societies into progressive organizations. What was dóne there may be done elsewhere. One way to bring these conditions about is to get the hearty co-operation of your Agricultural Representative in your county and the officers of your Societies. I think our Minister of Agriculture will arrange with Mr. Duncan, under whom the representatives work, that where a request arises for the co-ordination of the school fair with the fall fair he should at once give his consent.

Many of these small fairs do not make any creditable display of the real ability of the people, or of the production of their labours in their respective communities. Having thus far in life been actively connected with fair work in most of its departments, from exhibitor as a lad, to director, president, secretary and general superintendent for several years of one of the best (some say the best) county fair in Ontario, also on the staff of Departmental judges for the last fifteen years, I have had much opportunity to observe and study the needs and remedies for improvement in many of our weak societies. Several of these fairs were good active organizations in the same age that the country store and blacksmith shop were profitable factors in rural districts, but the community centre has changed. Here I wish to offer some constructive criticism.

The *first and main object of* any *fair should* be *Educational.* We are all agreed that the early periods of our lives are the impressive and plastic age, and that nothing should be of greater interest to parents than to see their sons and daughters *taking a keen and active interest in all the different* branches of work which range all the way from the products of the soil, the stable, the orchard, the apiary, the kitchen, the art of needlecraft, and art from the pen and brush. How *often have we heard the proud parent remark, "That is my son's exhibit*— That is my daughter's work." You see in this the parent gets part of the honour even when the child is the exhibitor. Therefore my suggestion is that several of our *small fairs and school fairs be so co-ordinated or* joined together *that* one fair would take the place of the two, and that it, or they, be called "The Junior Farmers and School Fair of the Township of ————————". I would *suggest it be worked out somewhat after this matter:*

1st.—Keep the junior part under the management of our present fairs association and the school fair under the Department of Agricultural Representatives.

2nd.—That the Junior Department be made up of exhibitors not over 30 years old, who have paid one dollar membership.

3rd.—That in a township the directors be appointed one from each school section and that they, of course, be not over thirty years old, thereby spreading the interest over the whole township.

4th.—That the pupils of Public Schools be not permitted to exhibit anything *from the field or orchard and no animal over six months old; that the school* girls department be kept strictly to the work done by the schools and in needlework and domestic science to things you would expect girls under fourteen years of age to do.

5th.—The Junior exhibits would commence where the schools stop; therefore there would be no duplicating of exhibits; for instance the Department of Agriculture would only supply garden vegetables and flower seeds and eggs for Bred-to-lay Barred Rocks, Leghorns and Wyandottes, then you see all the garden and flower exhibits would be by the school. The juniors would exhibit the field roots, potatoes, field corn and grain, except from the plots for which the seed has been given to the schools by the Department. In Poultry, the Juniors would exhibit any other breeds listed except Bred-to-lay Barred Rocks, also all animals above six months old which are listed.

6th.—At these township fairs where the school fair is being held in connection, all school children to be admitted free, likewise at our county fair where we have a championship school exhibit. You can readily see that when you interest the child you likewise interest the parent, therefore the township fair as well as the county fair has more exhibitors as well as increased gate receipts, thus extending the interest and education among many more people. We have agreed that our fairs should be educative. Therefore, could you imagine any better place for boys' and girls' judging competitions than at such Junior fairs as I have suggested. Even the students at the O. A. C. are planning their second fair, whereby they can place an estimate upon their knowledge and judgment in a practical way.

This I consider a very worthy climax to the students' years' study and work. Think of the opportunity which we can have quite close by our homes where we can give our own community boys and girls this valuable instruction and testing.

I believe I have made a reasonable suggestion for the practical co-ordination of our too large a number of fairs. We would be saving much valuable time and preventing the continual duplicating of exhibits, and making a really instructive and educational community gathering. We are asking for capable

leaders to-day. Let us hand over to our Juniors some of the responsibility of our small fairs and do our duty in helping to guide and direct them in their endeavour, and in a few years we will have more efficient judges, stock men, housewives and leaders who will be a credit to this young country of ours. This is our task.

J. LOCKIE WILSON: The only objection I take to Mr. Culver's paper is that he described "Juniors" as men under 30. In my opinion a junior should be a boy under 20. I am a great believer in the farmer boy and his father and mother and sister coming together at a township fair, each doing his part for the uplift of the while community.

J. F. AULT: Since coming to this Convention I have been a strong advocate of amalgamating the school and agricultural fairs, and when we listen to-day to the report of the number of fairs, both school and agricultural, amounting to nearly 800, all being held in a period of 40 days, I can't see why it would not be a good thing to amalgamate.

Mr. Lockie Wilson suggested to-day in our committee meeting, that if you and the school fairs amalgamated you carry on your school fair under the school fair management absolutely, give the children of the school fair a free admission to your fair, and a special place for their exhibit and let them have their own judges. By doing that you cut out about half of the time that is now being lost.

I have gone to school fairs where they held them in an open place, where it was almost zero. How do you expect to get results? When the school fair is held in conjunction with your fair and everything is comfortable and under cover, the results are more satisfactory.

JOHN DUNBAR, South Perth: St. Marys I think was one of the first fairs on the map which went into the union of school and agricultural fair. We have for years had the school fair attached to our Agricultural Society. Last year we had a bad day, but for all that we are financially ahead of last year, though it rained from one o'clock on. The school fair is absolutely separate. We hand it to the teacher who controls it. The Daughters of the Empire of St. Marys donated $50. I am in sympathy with union, but don't believe in forcing it on the small Agricultural Society.

A. E. CULVER: One of the surprising things is that only 25 of the school fairs have been held in conjunction with the fall fair.

R. S. DUNCAN: Some years ago I had the privilege of discussing this same subject with the annual convention of fairs and exhibitions association and a good deal of discussion arose. At that time we drew up a plan which made it possible for both fairs to be held in various parts of the province, and that plan still holds. Having had the privilege of assisting in the organization and conducting of the first school fair held in the Province of Ontario in 1899, I have seen them grow and develop until last year we had 515 rural school fairs with over 4,500 rural schools enrolled. I believe that the majority of boys and girls on our farms can be developed into good citizens if their energy is utilized in childhood to good and useful things.

During the past two years we have felt that school fairs should be held separate and distinct from agricultural societies' fairs until they got on their feet. We did not want to lose the identity of the school fair and we wanted the boy and girl to get the experience which would fit them for work coming on in the larger fairs.

I would suggest that the Board of Directors and the school fair get in touch with each other and discuss the matter in a friendly way and arrive at some conclusion. There are many things in the able address by Mr. Culver which should benefit us.

ADDRESS

HON. JOHN S. MARTIN, MINISTER OF AGRICULTURE

It is indeed a great pleasure for me to be again with you at your Annual Banquet, and I also want to thank your chairman for his kind words. I must tell you a little story about "kind words". A man was travelling out west and got lost. He travelled on for miles without seeing a sign of habitation; finally tired and hungry he came across a small hotel, and as it was the only place offering, although he did not like its appearance, he decided he would stop there. He went in and registered, then went into the dining-room where a girl came to *wait on him, with a very cross, surly manner, and asked him what he would have.* He did not want much of anything after looking the place over but thought he would take what seemed the safest. He saw some hens outside, and said, "Bring me some boiled eggs, some toast, and a cup of tea." As she turned to leave he said, "Wait a minute, and also a kind word." The girl went out and presently came back with the order which she placed before him, and as she was about half way out of the room he said, "What about the kind word?" She said, "Don't eat the eggs."

I think anybody could not help but feel impressed by the splendid men and women I see before me. I do not think there is one organization connected with agriculture in any way that is so representative of the life of this Province in every branch, rural and urban. And organizations of this kind can do a tremendous amount of work and a tremendous amount of good because you meet together here, and it is well that you come together at regular intervals to exchange ideas and to discuss matters for the betterment of the fairs and arrive at a policy of improvement for the fairs in general.

The agricultural fairs, we all agree, have done an immense amount of work toward the betterment and for the welfare of agriculture in general. And that is not confined to the Province of Ontario nor any other province. It is a universal fact, that without the stimulus of exhibitions and fairs the high standard of quality which we are continually striving to improve would not be possible.

When I discuss matters connected with fairs, I am discussing something which comes very close to my own personal affairs. I am, if I may use the term, a product of the fairs. I have been exhibiting for about twenty-five years and I completed this fall a record which I believe is unique in fairs in general, that is, I completed a record of winning the best *display* prize and about 90 per cent. of the first prizes at the New York State Fair, covering a period of twenty years. I made the record of ten years and the authorities in connection with the fair presented me with a cup commemorating that winning, and I was so pleased with the way they treated me that I decided to stay with them and make it twenty years. I completed that twenty years in September past. I do not think it would have been possible to have put the energy into my work that I did without the stimulus of these annual fairs. While there was a tendency during hot weather to slip back a little and lose a little interest, as the summer progressed you felt that at a certain time you had to exhibit once more and show

the product of another year, and in competition with the best that your competitors could produce. That was a stimulus and a spur that kept you up to the mark, and that, after all, is the real purpose of the fairs. There is nothing like personal effort. I can remember, some years ago, that I competed with no less than three millionaires. They had high-priced labour because money was no object, and it is real work to go up against the product which these men could produce, but there was always something, and that was those men were hirelings, as it were, and did not take the same interest in what they were producing as the man who was growing it himself, feeding and doing everything that was necessary and to whom it meant his bread and butter.

When I come among a group of men who are devoted to the interests and welfare and well-being of the fairs of this Province, I feel that I am one of you and that I know fairly well your problems and I am very anxious, and I think you know that I am, to do everything that I can to help forward the good work. You have in your keeping the progress of agriculture in this Province. It is in your care; the stimulus that the fairs of Ontario give to agriculture is constantly and continually increasing and it would not be possible for Ontario without that stimulus to go to the United States and win the prizes in agriculture that they do. Look at the record of the sheep men at Chicago year after year! Look at the record of Ontario at the National Dairy show! Look at the record of our grain! Look at the dairy prizes we win in England! That has all more or less been made possible by the annual exhibitions and competitions held in the Province of Ontario. That is the good work you are doing. Men go there, they see these displays and they get a vision; they see pure bred animals, dairy and beef cattle, and their thoughts travel home, perhaps to some common kind, and there is a new idea planted in their mind, and the thought is: How fine it would be if I owned cattle like that. And they make a resolve, some do, not all, unfortunately, and that is why it is necessary to carry on the campaigns that we do, because, after all, there are many indifferent farmers in the Province of Ontario, men who are farming just the way their grandfathers farmed, men who are content with any kind of live stock. Those are the people that the Department is trying to awaken, and I sometimes think that we have some farmers in the Province who are just like blind mules, they are satisfied with almost anything.

There is a big work for the Department of Agriculture just along that line, and if with the splendid displays that the agricultural fairs make each fall, we could give these indifferent men a vision to see what to do (it does not make much difference if they have not a great amount of money if they would just make a start with one good animal and go on from there), they would soon get the desire for something better than they have. Unless this is done they cannot make progress, and if they do not progress, the Province of Ontario will not make progress because it is only by united effort and by improving the live stock and grain that the Province can make the progress which we expect it to make.

There is one question that I know is agitating the fairs considerably, and on which I was asked to say something. My policy is not to tell you what to do. You must work these things out for yourself, because I believe in united counsel, and your combined efforts and your combined judgment will work these things out satisfactorily; but there are one or two things I want to say, and that is along this line: with respect to the co-ordination or the co-operation of the school fair and the agricultural fair, that the school fair and the idea of those who have charge of the school fairs is of course purely educational and devoted to

the youth of Ontario, and the purpose of the agricultural fairs is purely educational, and the school fairs of Ontario have been a success. There is not any doubt about that. In the days gone by the lament was the difficulty in getting exhibitors. The purpose of the school fairs is simply to produce exhibitors for the agricultural fairs and, in doing so, to educate them to the value of good stock, the value of good seed and the value of better farming generally. Trying to take a man 45 or 50 years old and teach him something is not the easiest job in the world because after you have done a thing in a certain way for 20, 30 or 40 years, we don't change as easily as the boy from 15 or 16. That boy is at an impressionable age and you can talk to him and explain to him why pure bred stock is very much more desirable than mongrel stock and it is a waste of time to go on with poor stock. The boy will listen to you, but the older man sometimes does, and sometimes does not.

And for that reason, if there is one branch in my Department in which I am more interested than any other, it is the work of the boys and girls in our school fairs of Ontario. I believe that is a good investment for the Province of Ontario, because you can easily see if you spend the money on a boy of fifteen years, teaching him that country life is the best life in the world and that you can make as much money there as anywhere else, if you use your head, and get him convinced that farming is a *real* occupation, you are doing something for the welfare of the Province. And when you consider the years the boy has ahead of him and the years the mature aged man has ahead of him, you can see the greater return on your money.

We have not any wish or desire to have our Junior work curtailed in any way. On the other hand, there is a feeling that perhaps in some cases it would be desirable to combine the school fair and the agricultural fair to the advantage of both, and in cases where that can be done on a proper basis of agreement, which is a very simple one, you will find that those who have charge of the school fairs have no idea or intention of being unfriendly, but their whole idea and purpose is not to have the school fair lose its identity. That will have to be worked out. I look upon it as a proposition for adjustment and co-operation. There must be co-operation on the part of the fair officials, the District Representative and those who have charge of the school fairs. I can take you to fairs that have been brought back to life by the school fair. They were simply dying a slow death. When they got together, the school fair was held the same day, they were given every consideration, they went ahead and the farmer only had to take one day off instead of two days, and a day means a good deal sometimes. So there are different things to be taken into consideration, and the whole thing I had in mind is that there shall be harmony and proper co-operation, and if it can be shown that it will be to the advantage of the school fair and also of the agricultural fair, I don't know of any reason why, if the proper basis of agreement is worked out (and one of the important ones is that the school children shall be let in free of charge), both the fall and school fairs should benefit in co-operation. That is my idea with regard to this question which you are discussing and you can't make any regular ruling because in many cases your fair would be held too late, and they would have to be held within a certain limit of time.

There is also another thing which I want to speak of because it concerns all the fairs and the welfare of the fairs, and that is with regard to the games of chance, which have been creeping in. We had to stop them at our own local fair in the county of Norfolk and the gang I saw there were not any credit to any fair, and they were not any credit to this Province. They were a bunch

of sharpers who came in from Montreal, and so far as the Department is concerned they can go back to Montreal and stay there.

Let me tell you how these things work out—if you give them an inch they want a mile. Down in the States I have been at different fairs and I have seen where they degenerated where they let these fakers come in. I can take you down to one fair in Maryland. It used to be a great agricultural fair and to-day it is nothing more or less than horse races and wheels of fortune. If I saw one there two years ago there must have been a hundred. It looked to me like a mile—those chaps were laid out in their blankets both sides, and they were there to take the people's money. You can't call these agricultural fairs. If we are going to carry on they must be carried on as agricultural fairs and, so far as our Department is concerned, we have no intention of letting these chaps come in with their wheels of fortune and operate at our fairs; because if we go on in that way the fairs of Ontario will degenerate and they will be anything but educational.

There is one announcement which I think will be of interest to you. We have been working for years to improve the quality of the seed and it has been difficult to get machinery to improve the seed as it should be improved, and to-day with competition as keen as it is and with our experimental plots and field plots and our standing field grain competitions it is necessary that you must have good seed to start with—the best you can get—and the very finest cleaning machinery that can be found anywhere should be used to improve this seed and clean it. A proposition has been lately considered by the Department and it has been encouraged and fostered by the railroad companies, and they have informed us that they will place at our disposal three cars and will transport these three cars from place to place, as we plan our programme. We have tried out different kinds of cleaning machinery and we have settled upon a certain type of machine. It has been commented upon favorably at Guelph and Kemptville, and also at the Central Experimental Farm at Ottawa, and we have decided to use this machinery on these cars to demonstrate to the farmer the advantage and value of good clean seed, and the Department is laying out a plan and a programme under the supervision of Mr. Lockie Wilson, and it will go from place to place. It will probably stay a day or two in a place and the dates and the time will all be set forth by our district representatives and also advertised so that the farmers in that community will be able to bring in their grain, and have a certain amount cleaned for them. And we hope that will be a sufficient stimulus so that they will want to have central cleaning places to clean their grain; and there is no doubt that the Department will consider favorably help to these associations.

If the farmer does want clean seed he will be able to take it some place and have it cleaned. That will be a great help to the Standing Field Crops and also to the quality of seed exhibited at the fairs of the Province, and I hope it will be taken hold of by the farmer.

I want to thank you for giving me the opportunity of meeting you once more. So far as I am personally concerned, I appreciate very much the great efforts, the time and the money which you put into this work, because very often it is a thankless task and I sometimes wonder that we get the class of men we do get who go on year after year doing this work and sometimes getting very little thanks, sometimes not even a kind word.

J. J. Duffus, President Ontario Plowmen's Association: I find it difficult to express my gratification at the kind welcome which you have given me and the pleasure which it is for me to be here. I attended your meeting this after-

noon. I listened to the reports and to the discussion, and my first thought is to offer my congratulations to the members of your organization for the splendid work you have been doing, and which I know you will continue to do in the future. It is no easy task to make a success of an undertaking like this, and strange to say, no matter how hard you try you will find plenty of people criticizing and finding fault with your work. In fact, it seems the harder you try, the louder the criticism and the harder the knocks.

Nevertheless, with such self-sacrificing men and women as are in your organization and the agricultural societies, the work which you have done has been a great advantage to the Province of Ontario. In addition to the strides which you have been instrumental in making in connection with advancing the interests of agriculture in the matter of stock and fruit, vegetables, grain and seeds, there is another work which you have done which no words of mine could give adequate expression to and that is the bringing together of all classes of people from the rural section with those of the urban centres. After all, our interests are common and we must pull together. There is no truer saying than the one, "If we don't all hang together we will all hang separately." We must pull together, township with township, and county with county, and province with province. Pulling together is the only way that we can as Canadians make of Canada the land of our vision.

Some fifteen years ago the encouragement of good plowing and plowing associations were under the control of agricultural societies, and subsequently under the control of township and county matches. The inspiration which was given by the good work accomplished by these organizations induced several leading farmers to bring into being what is now known as the Ontario Plowmen's Association. This Association is province-wide, and it is functioning throughout the whole of the Dominion of Canada and the United States of America.

The first meeting in connection with the Plowmen's Association was held in the City of Toronto and the success it has attained has well justified the vision and the faith the men had in it who were the original organizers, and I am happy to say that a number of those who identified themselves with the Association at that time are still actively engaged in the work.

The history of the organization tells us that the first president was Mr. Simpson Rennie; associated with him was no less a personage than our friend, your superintendent, and our managing director, Mr. J. Lockie Wilson. Associated with him also was the only surviving member of the first Board, now on the present board, and that is your president, Mr. James MacLean.

From year to year the Government gave financial assistance, and together with the enthusiasm and the public spiritedness of the general public, our organization has grown until it is international in scope, international in spirit, and international in reputation. Matches have been held in very many of the counties and the entry list for competition and likewise for the exhibition of farm implements has grown beyond our expectations.

At the first match, as the managing director has said, there was but one tractor and twenty-seven teams of horses; the next match four tractors and from forty-five to fifty teams, and it has grown year by year until four years ago the entry list was 163. Three years ago 193; two years ago 208, and this past year the entry list has increased to 267 entries. In addition to the entries for competition in plowing, the number of exhibits have likewise increased. At the International match will be found farm machinery and equipment of all kinds in connection with good farming, power machines and

hand machines, modern machinery for the home and for the outbuildings of the farm, and our organization is indebted to the manufacturers of these machines for a great deal of the success in connection with the International Plowing Match. The entries have increased from time to time, and this likewise has increased the attendance at our annual match and it affords the people of this Province and other provinces as well who come to the match an opportunity to see machinery working side by side under different conditions and different kinds of soil, and in many cases it has given farmers a splendid opportunity of selecting a machine which is best adapted for their purpose, and again it has given the farmer and the manufacturer a chance to talk over the situation, and it has helped out to a considerable extent on many occasions.

I have said that our match is international in spirit and international in participation. I say this by reason of the fact that year by year we have a number of entries across the line, and, in addition, we have a large number of visitors from the American side. Plowing matches are and were for the purpose of encouraging good plowing. Good plowing has long since been admitted to be the fundamental operation in good agriculture and the basis of good farming. Strange to say, wherever you see a good farmer you will see a good plowman. The craftsmanship which is inseparable from good cultivation of the soil manifests itself in every act of the farmer. Invariably it happens that where you see a good plower you see a successful farmer. Not only is he successful but, generally speaking, the most influential citizen in his community. Anything that promotes good cultivation of the soil adds to the prosperity of the farmer, advances the earning power of the community and increases the wealth of the nation.

In different classes of soil, of course, there should be different types of plowing according to the climatic conditions, character of the soil and the type of crop which the farmer wishes to grow. Plowing has more to do with good farming than any other operation on the farm. For far too many years some of our farmers have followed the policy that any old thing will do to plow the summer fallow. "We will plow it when we have nothing else to do." I can conceive of that kind of a farmer looking forward to the time perhaps when he has nothing else to do. But the man who farms his farm scientifically, with the one thought in view that he is going to get the very best out of it, can never look forward to the time when he has nothing else to do. Just as it is necessary to follow the proper kind of plowing, at all times in order to get tne best results from the land, just as it is necessary to eliminate from your herd tubercular cattle in order to get a high standard of results, so is it necessary to eliminate all kinds of weeds in order to get the best in farming. Just as it is necessary to grow the proper kind of hog to compete with Denmark, so is it necessary to grow the very best possible grain and seeds in order to demand the best possible price on the best markets of this country.

It is not my intention to keep you any longer, but I would like to point out to you in conclusion that we, the members of the Ontario Plowmen's Association, are proud of the fact that our work has reached out until it is now, as I said before, of an international character; we are proud indeed to rub shoulder to shoulder with our American friends. Our boys and theirs fought side by side; our boys and theirs are plowing side by side. And for upwards of 100 years we have lived in peace and harmony side by side—3,000 miles of boundary line without an instrument of protection, or shall I say an instrument of destruction! This is a record that the world should be proud to follow, and we, as I said before, are proud that we have been able to interest our American friends so

that they visit our international plowing match by the thousand and show a profound interest in the work.

In view of the fact that our organization and yours have had the one thought in view in the past, namely what is best for agriculture in the Province of Ontario, my best wish is that you may continue to succeed and as time goes on, you may be even more effective in advancing the interests of agriculture in the Province of Ontario.

COL. C. R. MCCULLOUGH, Hamilton: It requires more courage than I possess to measure up to the very splendid addresses I have been listening to. With respect to the Honourable Mr. Martin, his splendid work is known to us all. If you have been reading the cables of late, you would have seen that Canadians are the champion egg eaters of the world. Per capita we consume about two to one of those consumed by the nation standing next to us in order.

With respect to the Plowmen's Association, I have in my dining-room a steel engraving; it is a picture of the great Garibaldi, with his little son, at the plow showing him how to cut his furrow clean and clear and straight, to the end of the field. This is not simply a physical lesson. This is not a lesson in plowing of the earth. It is a great moral lesson which I have the pleasure of looking into and being inspired by it day by day.

The fairs and exhibitions of this premier Province of Ontario occupy a position of service second to none in this Province and country. A year ago last fall I had the pleasure of going out to Brampton, to the great plowing match. I had never before beheld such a great aggregation of plowmen and plows and implements of agriculture as I saw on that occasion. James McLean drove the oxen, and I have never seen oxen driven better in my life. We should remember that in the days of the pioneers of this country, the early settlers used oxen for much of their work.

I am delighted to know that here we have not only representatives of agriculture but, in the addresses which we have listened to, evidences of culture also. I don't think that the toastmaster of the evening was at all amiss when he said you might search through this country to find a finer representation of the people of this country than those gathered here to-night.

Speaking of culture, one hundred years before our Christian civilization, when Rome was laying the foundations of a state that was destined to be the mistress of the world, the little state that began along the banks of the Tiber with a handful of people, a people who parcelled out land, that small community rose to dictate the policy of the world. And in those days before the Master came along this earth to tread His lone furrow, one hundred years before Christianity, an author in agriculture arose—Cato, the statesman, the great soldier and scholar, wrote books on agriculture. And he was asked one day, "What is the most profitable form of agriculture?" And he said, "Grazing." "And what is the next best," he was asked. "Tolerable grazing." "And what is the next most profitable?" "Bad grazing," he answered. "And," said thequestioner," what is the next best department of agriculture?" He said, "wheat raising."

There is a tragic note there, and when Rome, rising from the small beginning along the Tiber, forgot to cultivate her lands, then began decay and destruction. And so it was in those old days of Rome. Rome forgot the meaning of the plow. There was a time in the history of Rome when the men who led the great Roman legions to victory were on a par; the man who fought with his sword and the man who fought with the plow were equally honoured by Great Rome; but when she forgot the plowman and exalted the soldier, she entered upon a course which was destined to bring her to the sword.

So it is with this great organization which has to do with the cultivation of the sod, and the great golden field of grain, and who can look upon a great golden field of grain without finding a moral lesson in that great gold waving in the sun!

Your great job is reaping these glorious harvests, and how those harvests tell in the prosperity of a nation! I come from a great industrial centre, the home of a great industrial agricultural implement industry. I had the pleasure on Monday of addressing a gathering of agents that has to do with the making of those agricultural implements, and I realized what your success here in Ontario and what the success of those great wheat fields of the West had to do with the City of Hamilton. Immediately we had the improved crop of last year and again this year, we felt the improvement in Hamilton.

I am a believer in national unity; I am a believer in setting up a high standard and trying to attain to it, and I want you to note that the cables of this morning indicate that the British Government have placed an Act upon the Statute Books whereby the products of all the countries sold on the British market must be marked with the name of the country of origin. That means that we have got to produce goods and products that will stand in the forefront of the products of the world. So when I go back to my office and workshop and you to your plow and workshop, we must pledge ourselves more than we ever did before to reach a high standard of excellence, before we can expect to sell goods that for durability and excellence stand up with the products of any other country in the world.

At our "Produced in Canada" meeting the other day, there was a representative who had paid a visit to Denmark, and he brought back splendid lessons of the accomplishments of a small people in the countries of the world. Denmark is not so big as Canada, but the great Roman Empire started with an empire of people along the Tiber, and our fathers were but few in this land of long ago. There were but few in 1765 when the first fair was held in Nova Scotia. But to think that from that small beginning we have to-day 360 agricultural societies in this great organization and 220,000 members!

What can not 220,000 men like Hon. Mr. Martin, J. Lockie Wilson and James MacLean do in these organizations for the welfare and progress of this country!

When you go out to buy things, and especially women who are the great buyers, I would ask you to examine the goods, turn them over and see first of all if they are satisfactory and then, when you know it is made in Canada, try to have a preference for the things made in your own country, whether it is a piece of linen or a pair of shoes, because it only needs a few thousands of people to stop buying Canadian shoes to have shoemakers living on the community. This Produced in Canada organization is interested in relieving unemployment, and of all the men under God's heaven, the most unhappy man is he who has nothing to-day. Old Tom Carlyle said, "There are enough coats for all the bare backs of the world and our problem is to bring the backs and coats together." That is the problem of Canada now. It does not matter greatly who sits in the seats of the mighty at Ottawa, but it does matter for the rank and file of Canadians to try to make our country more prosperous, and just a little better for their living than they found it.

Short addresses were given by Mr. Archibald, Director of the Central Experimental Farm; Dr. Morrow; Mr. Jackson, Western Fair, London, and Mr. Paisley of the Central Canada Exhibition. A motion picture was shown of the International Plowing Match at Brockville in 1925.

CLASSIFICATION OF HORSES

Wm. Doherty, Toronto

It has appeared to me that something should be done at our fairs whereby the exhibitors of horses could understand the right class in which to enter their horses.

In reference to the heavy horse classes, namely, Draft, Agricultural and General Purpose, I would suggest that the Fairs' Association divide the heavy classes as follows: Draft, Light Draft and General Purpose, and not use the word Agricultural, as this term does not cover a distinct breed. We often find mares shown in the Agricultural class which are sold as registered Clydes.

I also think it is the judge's place to tell the exhibitor what class his horse should be shown in if he should have it entered in the wrong class. There is wide difference in the general purpose horse, another type of horse of no registered breed but a very useful kind of horse. This breed of horse when matured should be a horse suitable for plow, buggy or saddle. The general purpose mare when mated with a good thoroughbred horse raises a good sized hunter, for which there is great demand and good prices are paid for those horses.

Our carriage class is mostly for Hackney or crossbred Hackney horses. They should have good all-round action, conformation and manners. No pacer should be awarded a prize in this class. There is some discussion as to height of animals in this class. They should be divided into two classes, 15.2 and under, and over 15.2 hands. There has been a standard for ponies and carriage horses, the carriage horse at 15.1 and the pony at 14 hands, which leaves a lot of useful animals out of the show ring if that rule were adhered to.

The standard or road horse class should be divided into two classes—15.2 and under, and over 15.2 hands. They, too, should be judged on speed, conformation and manners, and be shown in harness. I would suggest that all standard bred stallions be shown in harness. In this class of horse we get trotters and pacers. The thoroughbred horse which is gaining much prominence in Canada to-day is a good type of horse, and one of the best and truest bred of all our registered horses, and no other horses will leave their mark as the thoroughbred does when bred to mares of any other breed, and no other colts are bringing such a price, if you have good-sized hunters, and I would recommend a class for the half-bred colt where the neighbourhood is raising them. Mature horse classes should be judged under the saddle for conformation, quality of bone, length of neck, shoulder, back, and good strong quarters, also at the walk, trot and canter, and for manners.

The pony class, the class that the younger generation is thinking about, is one of the hardest for the amateur judge whether the pony be saddle or harness, or combination. Stick to the pony type, pony head, ears, and pony type throughout. Too many of our classes are filled with miniature horses which do not look well in a show ring with an up-to-date pony, and anyone showing any other than an all-round pony should not be awarded a prize. The height of ponies as drawn up by the breed associations is as follows: Hackney ponies, 14.1 hands; Welsh, 13.2 hands; and Shetland, 44 inches.

There has been much discussion about the prize for the get of sire at two of our leading fairs. The prize was won by the Dominion Transport at one, and at the other by the same exhibitor, and the Cooksville Shale Brick. Those special prizes should be in the breeders' classes and not open to those who are practically buying horses for show purposes.

MR. ROWLEY, Elmvale: In our district where there is only one class, the contention is that Percherons should not be shown in the same class as Clydesdales.

WM. DOHERTY: The Percheron is a draft horse as well as the Clydesdale. The Percherons have a right to be shown with Clydesdales in the draft class. For the rural fairs I would suggest that horses 1,500 pounds and over go into the heavy draft class. The Percheron mare bred to the thoroughbred horse has not been a success. You will notice the Percheron has a shorter neck and not as good a back, and its hind end is a little higher. I would not recommend breeding Percheron mares to thoroughbreds unless it was the second cross.

PREPARING A FALL FAIR BUDGET

JUSTUS MILLER, ESSEX

Estimating the amount of money to be spent on a fall fair is a very important matter. I know, so far as the fairs that I am best informed about, their assets are not a true statement of our fairs except as going concerns. For instance, I find that we have invested in land and buildings and equipment anywhere from $10,000 to $20,000 on our larger sized fairs, exclusive of the big ones. Most of those buildings are old. They have been built especially for fair work and in our own case at any rate they have very little value unless the fair continues to operate. If the fair suspended, those buildings would be worth just about the material in them less the cost of wrecking, and if any of you have had any experience in wrecking operations you will know the cost of wrecking is just about equal to the cost of the material you get.

In most of our fairs where real estate is valuable, no doubt the valuation of the fair land will be much in excess of liabilities. In our own case that is not true. Our fair is a relatively large one and yet it is located in a town of 1,800. The land located on is just farm land worth about $200 an acre, so that I think, as a proposition that might be propounded, our fair to-day is bankrupt. Now I am being perfectly frank; I am satisfied from looking over a lot of other fairs that they are bankrupt. We don't know we are bankrupt. We are not bankrupt, of course, as long as we are in operation, but as a business proposition I believe we are.

This brings us to the fair as a business proposition. All of us have a big overhead. As a business proposition we should have a yearly fund set aside—on a $10,000 valuation we should have at least $500 set aside as an improvement fund. I mean by that money to pay for improvements that we need in excess to the buildings we have already.

Then we must set aside another $500 to take care of depreciation, because if those buildings are to be kept up properly it will take 5 per cent. to do that. As a business proposition, we must have that improvement fund set aside.

We have a high cost of operation. We have a proposition that is not working almost the whole year—for three or four days it does work. We must go into the labour market and get men for a short time. In our own case we pay from 40 to 50 cents an hour. Certain men working our parking arrangements get as high as $15 a day and we have to pay that to get those men for that short time during the year.

Then we have another handicap. Our fairs have been organized twenty years or more; conditions of life have changed since then; we live to-day in the gasoline age. Consider our situation to-day, thirty-five miles represents little more than an hour's travel, people can go to our fairs from long distances to-day, and that means that our fairs must compete with each other on a straight show basis. The old days when people went to a show to see Josh's large pumpkin or to meet each other once a year, are largely gone. They have gone because the automobile takes us long distances and on account of the school fair. After a man is 35 years of age his life is fairly well centred in his children. He will go with them where he would not go himself. I know this business of amalgamation of school fairs and fall fairs is very popular with you, but unless you can show the school board some advantage of combining with you they will never do it. In our county we have tried to do it. We have two township fairs, and we tried to get school fairs to amalgamate, but they refused to have anything to do with it in the one township; in the other case we did amalgamate, had a two-fair day, let all the youngsters in free, and now the school fair board met two weeks ago and decided they would hold their own fair. The Department of Agriculture is powerless to do anything in the matter because that school fair board conducts their work just the same as we do.

The fall fair must put up a show that will attract a crowd and yet some 30 per cent. of the money they receive must be given for educational enterprise.

Then we have probably our greatest obstacle in expert management. We know of shows run by men who have made that their business all their lives, and yet they have gone broke; now here we have the position where a man busy with his other work all the year attempts to handle a fall fair; he does not know how much money he should spend for advertising; he does not know the drawing power of different attractions, what money should be spent, or the best way to spend it; he is not a skilful advertiser. In other words, he cannot analyze the whole field of fall fairs and that is a thing I think perhaps this Association can do something in regard thereto.

Mr. Lockie Wilson's department should give that kind of advice and assistance. It is absolutely impossible for Mr. Wilson to visit your fairs, to try to analyze your business, to determine why some of the fairs have succeeded, while others have failed; to make a true analysis of our financial statement. It can be done only by an expert, who to begin with has a knowledge of showmanship and fairs, and by that I do not mean some $1,800 graduate of a college; I mean some practical man who knows his work now and in a year could analyze our whole situation, who could recommend certain amalgamations, certain co-operations, and could go to any fall fair board and say: "Here is what has proven in the past to be profitable and successful."

We are trying to run a business with a heavy overhead expense and we only run it three days a year, and worse still, if it rains or snows we cannot get at the public for another year. In a good year profits must be made just that much larger.

We have the goodwill of our people and that is the great asset of our fall fair. Unless your community will support it, unless you have the kind of community that is progressive, you cannot expect to thrive as a fall fair. You cannot get behind public opinion; you must be ahead of it.

Then you have the question of donations from the public. A large amount of money is paid into our fall fairs, not as a business proposition, but it amounts in some cases to many hundred dollars a year. I have taken this question up of revenue, because your budget is based upon it. You can only spend

the money that you have, but the money that you get depends quite largely on the money you spend and how you spend it. Then what kind of a show can you put up that will get you the most money, and how can you get that money?

The great source of revenue in the fall fairs are the gate and grandstand receipts. I would like to see at every fair a good show at a good price. How a little township can hope for any development on a 25-cent gate one afternoon in the year, I do not know. I know the public wants it, but that same public wants a 50-cent show. We must either have cheap shows at cheap prices, or good shows at good prices. And I would like to see the fairs of this Province establish a set gate price, and I think that should be 50 cents.

Now your next great source of revenue are your concessions. I know that there is a distinct ill-feeling toward concessions. I know a number of people do not like them, but the midway attracts a great many people to a fair who would not come for any other reason. It is like a great many other things—you have to give people what they want.

Then we have our donations, and then we have our Legislative grant.

A budget must be based on all those factors and must be scientifically allocated. I will just sketch as briefly as I can how we in Essex try to work it out, and this is on the basis of a four-day fair, three days of show afternoon and night. It does not apply to a township fair, one-day. It appears to me as though in that case we must have amalgamation. That is my opinion—the result of operation and experience in our own county. We have three of those little fairs and two larger fairs, and I think the time has come when we should have one fair in that county. I know if we had one large fair we could get the whole community out.

Then a word about the history of our finances: in 1922 we held a two-afternoon show; our recepts that year were $5,800, our expenditures were only $4,700, and we got a windfall. We made over $600 clear cash. We had $400 or $500 in the treasury. We paid off a mortgage that year. They thought then we could go a little farther and have a three-day show, an afternoon performance. That year we put the gate receipts down—that was the first mistake we made. We had the largest crowd we ever had. Our expenditure was $6,900, our receipts were $6,400, and we had to spend $1,800 besides that in improvements to provide for the new fair. We lost about $2,500 that year, considering those improvements as an expenditure. The next year, 1924, we had a huge crowd. I guess a lot of them expected another 25-cent gate. We charged 50 cents. Our receipts were $10,000 some odd, but our ordinary expenditure was $9,200, and we had to put another $1,100 into improvements. Last year we fell into the slump; our receipts were $8,800, our ordinary expenditures were $8,924, and we had that same year an improvement of $1,400. As a result those three years, on a basis of average, our gate receipts were $8,500; total improvements were $4,300 and total deficits $3,800, and we have a net gain of $471 only on paper. In three years we have only got $471 toward an improvement fund and yet with our investment we should have $500 a year to make arrangements for that. We have not made any arrangements for a sinking fund at all, and on that basis we are in the hole $2,500 on those three-year operations, although I can give you those figures and give you a pretty good case that we are $471 to the good.

What is a safe budget? A budget is the kind that does not anticipate profits. The trouble was we based our expenditures on $10,000 receipts, and we had it once in three years. In making up a budget the only safe amount

for expenditures we can arrive at is $8,500, and I told you we needed $1,000 for improvements so that we have only $7,500 to spend. How will we spend it?

Field Crop Competition	$25 00	Insurance and Interest	$635 00
Judging	100 00	Printing	200 00
Salaries and allowances	425 00	Advertising	250 00
Repairs	100 00	Miscellaneous	500 00
Labour	525 00	Prize list	2,220 00
Hydro	300 00		
		Total	$7,500 00

With reference to the amount for insurance, that included rain insurance.

Advertising.—I don't think that is enough money. I wish somebody could tell me what proportion of the total amount you should scientifically pay on advertising. In advertising, I don't think we should try to tell too much. I think the circus is a pretty good line for it. You will notice they have the date and the place and they get as many lions and tigers and bareback riders as they can put on the posters. But be sure to tell the truth and be sure the public understands it.

The amount on the prize list of $2,220—that is nearly one-third of the total budget. Last year we had school marches, drills, costumes, singing, sports, all for the kids. Then we had educational classes, baby clinics. Our baby shows, women's judging teams—something like they have in Chicago, we had boys' live stock judging teams, we had lectures for ladies, we had educational movies, and all that costs money. This year we are going to have our ordinary classes, our junior work, and we are cutting out all the education. We are doing that because we never make any money out of it. We are in a position where we have to retrench. To put up the kind of show that people want we are spending about one-third of the whole earnings. Last year we had a pageant, two years ago we had one. We are not having one this year. Although it has been a wonderful thing, it gets all the community working and it gets all of the grandmothers in the community out to see Mary and Bob show themselves off. Our trouble is that we have a little town of 1,800 people; we have fourteen communities as much as fourteen miles apart; it is a tremendous effort to get up a pageant. The trouble we found principally is that we have not a Canadian pageant company. It goes a little against our grain to have a revamped American pageant. We had that, first of all, but we had to write ourselves practically all the Canadianism into it. And last year we could not get one unless we wrote it ourselves. We called it the "Spirit of Canada." Until we get a Canadian company, with Canadians in it, who understand what Canadianism is, who know what we think and what we feel, and you can give our public something like the Canadian National Exhibition gives, until that time I don't believe pageantry will reach its full success in this country. But I think with a little patience you can make them a success. It costs a lot of money, but it is a good thing.

The attractions we have this year are soft ball. They have three teams throughout the county, and they give a cup. They have boys' baseball teams; we have imported some pretty expensive baseball teams, and my experience is that you offer a far greater attraction in having your own boys play a game, to bring all their people out and root for them.

We are having horse racing every afternoon. We pay $770 for that. Free acts, $1,000. We pay for band, $300; soft ball, $50; and baseball, $100. It seems to me as a financial proposition, until we can develop other sources of funds, that that is the kind of show we will have to make money on.

There are three things I would like to advocate in regard to the financial part of shows, the first of all is amalgamation. Strength will be lent our shows by amalgamation. The next is co-operation. Why can't groups of fairs all over the country get together and form a circuit? If we could get a circuit we could get out carnival companies much cheaper. Why can't we form a circuit of our larger four-day fairs of these equipments of various kinds, to work over the circuit, if we had a fair field man to work in the field.

MR. LEONARD DREANY, North Bay: A survey was taken of the fairs of the United States and they figured from 7 per cent. to 8 per cent. of the receipts should be spent for advertising. Last year in North Bay we spent about $350, about 8 per cent. of the receipts. $150 of that was spent in newspaper advertising, so 8 per cent. seems pretty reasonable.

AMALGAMATION OF SMALL FAIRS

W. P. MACDONALD, PETROLIA

The subject allotted to me for discussion at this convention is one that requires the careful and deliberate consideration of every one present. You will readily see that such a subject is very difficult to discuss with just such an audience; for the reason that this assemblage is responsible for the carrying out and staging of our annual fall fairs. Each and everyone is directly and personally interested in their own particular fair, guarding its welfare as a personal proposition. Therefore, I appear before you in constructive criticism, knowing as I do that all my ideas will not meet with your approval.

My first thought in a discussion of this nature would be, "Have we too many Fall Fairs?" Before answering that question fairly and squarely and without bias one will have to "take stock," using the expression as a merchant would do. First of all, what changes have taken place in the community life since the first fall fairs. Secondly, what are the objects of an Agricultural Society?

Records go to show that as far back as 1830 Agricultural Societies were organized in the Province of Ontario and at that time began to receive assistance from the Provincial Legislature. During this period of almost a century wonderful progress has taken place. Yearly new communities were founded and new Agricultural Societies were organized until to-day there are more than 350 Societies. During the past ten or twenty years, however, I believe not many Agricultural Societies have been formed in the older or more settled parts of Ontario. In looking over the Agricultural Societies Act, I notice that a "limitation is placed as to the distance from the nearest Society." The Act states that a "Society shall not be organized within twenty miles of an existing Society organized under the Act." There is, however, a special clause whereby a Society may be organized under certain conditions by special permission of the Lieutenant-Governor in Council.

I take it that the intention of the Act was that each Agricultural Society would serve a community. What has happened to the communities during this period? In one life time the boundaries of the community have enlarged. Twenty miles has become a matter of an hour. A community centre is visited as often now in a week as it was in a year twenty years ago. The day is past when the outing the farm boy received to the fall fair was one of the events

of the year. The whole farm process has been changed. In shoving back the forest and wrestling a living from the soil each article of production was looked upon as a special achievement. The Agricultural Society through the fall fair brought into competition the various exhibits depicting the special achievement of the individual exhibitor and the advancement of the community at large. To-day while we applaud and encourage special achievement in farm practices, the application of industrial methods to farming operations has resulted in a large number of farmers being more concerned in mass production and returns than in individual achievement.

An Agricultural Society should be the centre of agricultural activity in a community. The Agricultural Societies Act states that the object of a Society shall be to promote improvement in agriculture, horticulture, arboriculture, domestic industry, manufactures and useful arts. Various means of promoting the objects of the Society are then outlined. But here is the second place where we should take stock. What do you find? The sole activity of many Societies during the year is the staging of the annual fall fair. Some Societies carry out field crop competitions. The large field of community activity as outlined by the objects of the association is entirely forgotten or overlooked. As to the fall fairs are they to-day filling their place in the community life as they did thirty or forty years ago? I believe you will agree with me that they are not.

To be definite and to draw a comparison, I wish to outline the condition as it exists in my home county (Lambton), and possibly there are many other similar situations in other counties of this Province. In counties where there are only one or two fall fairs held annually similar problems do not exist. In Lambton county we have ten Agricultural Societies and ten fall fairs in nine townships, as well as two fall fairs held on the Indian Reserves, making twelve in all. The shortest distance between two existing fairs is six miles. Twelve miles is about the distance between an existing fair and the next closest fair. Each Society is carrying on and paying their way. Some of the Societies may continue to do so for some time, others again have a big financial problem. To give you an idea of the cost of carrying on these fairs, they receive approximately $2,500.00 in legislative grants, $1,200.00 in county grant, $2,000.00 in township and town grants, as well as, at the very least, $1,000.00 in membership fees, individual grants or donations of $3,000.00, gate receipts of $10,000.00, all told a conservative estimate of twenty to twenty-five thousand dollars.

The above fairs are all two-day fairs, with the exception of one fair which is a four-day event. The question to my mind in so far as our county is concerned, are we as a community or a county getting returns in proportion to the expenditure? Is agriculture being benefited each year by the annual exhibit in proportion ot the expenditure in fall fairs? Would not an amalgamation of the ten fairs into one county fair—if properly handled—be of greater value to agriculture and the county at large?

In looking over the two-day fairs, one must be impressed with the fact that it is a hurried event. The first day exhibits in fruit, roots, vegetables, grain, domestic work, etc., are all in their places and judged. The second day the live stock exhibits arrive in the forenoon, immediately after dinner the judging of exhibits commences. By twelve o'clock the second day only a small part of the attendance has arrived, by 2.30 p.m. the grounds are filled with the people of the community—here is one of the greatest changes that has come about in the matter of attendance—the auto has allowed the farmer to do a half day's work at home in the forenoon and then to take a half a day to attend the fair and be home in time to do his chores.

The event on the whole is a very fine social gathering or visit; relatives, friends and acquaintances all meeting in a happy mood. The fair proper reveals, however, that the competition has not been keen. Possibly three herds of beef cattle have been shown, one or two herds of dairy cattle, three or four breeds of swine, and the same of sheep.

The advantage has been with the breeder because the opposition, if any, has been small. Probably in his breed of stock there was no opposition, therefore he has won all the red ribbons and made a clean up in prize money in his particular department. This is duplicated in the poultry exhibits as they go the rounds of the fall fairs. The same horses, poultry, swine, sheep and cattle, together with some of the other exhibits, may be seen at three or four fairs in our county. The time limit to the fair does not allow for the staging of real genuine educational exhibits, nor have those in attendance sufficient time to consider the real educational value of many exhibits.

You may say what advantages would amalgamation offer? In the first place, a four-day or one-week event would bring together a large exhibit, keener competition, greater numbers of people. There would be more time for educational exhibits and a study of the same. With our present total expenditure under one organization the prize money offered would be more in keeping with the effort expended and therefore bring out a larger exhibit. A real true picture of county development would be depicted annually, personal achievement in production would receive encouragement. The mercantile and industrial exhibitors would meet greater numbers of people. They would bring before the public the best they have to offer. Exhibits would have to be prepared only once a year. Time, labour, and duplication of effort would be a great saving.

I believe it is high time that some constructive thought be given to the amalgamation of fall fairs in counties similarly situated as we are in Lambton county. Any personal feeling we have in regards to our own local society will have to be overlooked. We are not living in a small community as our fathers were thirty years ago. In a larger community with wider interests and in the interests of progress and development, we have to adapt ourselves accordingly and be governed by present day conditions. In Lambton county we have a committee of representative citizens appointed by the Agricultural Society to study the problem of amalgamation of the fairs. They are to formulate a plan of amalgamation and to report to a general meeting of the Societies from time to time. We hope in the course of two or three years to bring about an amalgamation of the ten societies into one county fair.

MR. NORRIS, MITCHELL: An amalgamation of ten fairs would be rather too radical a change. In my county, we used to have a fair in every township, now we have four or five fairs in the county. While our fair is not financially a great success, we are holding our own and think it meets the needs of the community better than holding a county fair would do, as a great many people take the fair in of our three townships that they would not if they had to go another ten miles.

R. N. TIPPER, Muskoka: Mr. McDonald's plan offers a suggestion along the line of Mr. Culver's talk yesterday afternoon, and that is the encouragement of a method of amalgamation specializing on the junior exhibits.

Touching on the school fair amalgamation, my experience has been that you can make a success of it provided you take away some of the cheaper side shows that are liable to attract the attention of the children. That is one of your big troubles. Then again, we have the question asked on that same

thing: "Why should the fall fair help to finance the prize list of the school fair?" Simply because in a great many cases the object of trying to get amalgamation is financial, and I think the Society should therefore help financially. They should be run on a more than fifty-fifty basis.

Whether we like it or not, it seems to me that the hard thinking business man has got to admit that something must be done to improve some of our smaller fairs. It seems to me that credit is sometimes not given to the men who are working with the management of the fair, and my suggestion would be that there be a regulation made that a man be not allowed to hold a presidency for more than three or four years at the most. Pass it around, and let the man that is replaced for president this year do the same as his directors, boost the new man. I have been to many meetings of fall fair associations where a director is proud of the fact that he has been associated with the fair for eighteen years. It seems to me there is just as much credit due the director as there is due to the man who has monopolized the office of president. A past president should not be on the list of honorary presidents; he should be on the directorate. The continued loyal work of old officers would go a long way toward making successful fairs.

In the case of joint fairs, Mr. McDonald advocated one central county fair. I think he would be the last man to say we should have only forty or fifty fairs in the Province next year. We can start where there are fairs, three or four miles apart. We have a few farmers contributing to one fair, and all we have to do is to ask judges how many times they see the same piece of fancy work, the same piece of sewing. The exhibitors spend all their time on one piece, and they win on it at every fair. Is there any encouragement to amateur exhibitors?

J. F. Ault: I have been listening with a good deal of interest to speeches advocating amalgamation of fairs. When I first attended this Fairs' Association we had some 75 to 100 delegates, to-day when I look over this big convention and see between 200 and 300 delegates; the question comes to me, are the smaller fairs losing interests? I do not believe they are. The smaller fair has its own benefits in that immediate vicinity in which it is run. It is the young people we want to take hold of these fairs and take the place of those getting older and carry it on. I have listened with a good deal of interest to the discussion on amalgamation. If you have a county fair, are you going to get from that county the same percentage of an attendance from the young people that you would if you had your own township fair; and after all, it is the young people of this country who are going to be the exhibitors of the future and are the exhibitors to-day at our larger fairs? That is the object of our different fairs. Education, from the very start, always upward and onward, is the object of every Agricultural Society. So I don't see how we are going to derive any benefit from amalgamation just yet. When we understand that we have 360 Societies and some 450 odd school fairs, both running along the same lines, educationally, I can understand that an amalgamation of school and agricultural fairs might be a benefit to this Association, and I hope I will live to see the day when the school fairs and agricultural fairs will unite, the school fairs running their own affairs assisted by the officers of this Society. Then the amalgamation will be of benefit to the exhibitors and sons and daughters of this Province.

J. Lockie Wilson: Mr. McDonald was speaking pretty largely from the viewpoint as he saw it in his own county. I quite agree with him that some twenty odd fairs in his county is a pretty big order for one county. But these school fairs are doing a splendid work in the Province. And what is the object?

To educate the lads in the townships, in the outlying districts to become exhibitors and officers in their own locality. The idea of centralization does not altogether appeal to me, because we sometimes complain that there are too many boys and girls leaving the concession lines and coming to the cities. If you wipe out these social centres, where the school boys can bring their colts and calves and become trained in a small way, if you are going to say to those lads: "We are going to wipe out your township fairs and have a great centre where these boys will all have to gather in the town," It is not going to work out very well.

You see we are living in the 20th century. Automobiles are covering our highways from one end to the other. How are those lads going to get those sheep and horses and cattle driven over those highways to go to a centre? But they can go to their local fair, compete with their own neighbours, and I am bound to say that this institution which has weathered the storm and gale for forty years in Ontario is going to continue on through the years. If a township fair does not spend much money they don't get much of a grant. Their grant is based on their prize list for agricultural purposes, so I contend that the time is not ripe for the amalgamation of the small fair and the larger one. After all, is it going to be of great educational value to bring your lads from the country, to get in touch with the red lights and the midways in the large centres? How many boys who come to Toronto or the larger towns are going to spend much time around the live stock? I am looking forward to those lads taking the places of the fathers.

A president should be changed every two years and new blood brought into the directorate every few years. We will watch with interest the development of Mr. McDonald's amalgamation in Lambton, when he reduces those small fairs to two or three and makes a success of it.

NECESSITY OF SEED CLEANING PLANTS AND REVISION OF GRAIN PRIZE LISTS

E. K. Hampson, Kemptville

The fact that Ontario does not meet her seed requirements each year is not because abundance of good seed is not produced in the Province, but rather that comparatively few individual farmers and very few communities have made seed production, particularly of the cereals, a definite enterprise. We have become so outstandingly a live stock province that this profitable and important business has been neglected. Thus we have the condition of many good farmers using poor or mediocre seed grain, and others wishing to get a change of seed, securing it from outside sources. It should be one of the duties of the Agricutural Societies to encourage the production of good seed among their members, and to see that the general standard of farming in the community is gradually raised. This is not difficult to accomplish, so far as supplying the needed quantities of good seed is concerned. We do not lack production, but rather facilities for cleaning and grading it.

I would not suggest, as a general plan, the operation of seed cleaning plants by Agricultural Societies themselves, but rather following commercial lines of trade already established. Most owners of mills, if given assurance of a fair amount of business, are willing to install the necessary machinery. This is the logical place for these plants in rural districts, as there is usually sufficient

space in the building, and power already installed. It is true that some experience is required to handle this special work satisfactorily, but the mill owner will probably pick up the points involved more readily than most people in the community. To illustrate what may be accomplished along this line: A mill owner at Carp installed seed cleaning machinery in his mill in December. Since that time he has graded a large amount of grain grown by the competitors in the Field Crop Competition. At least eighteen hundred bushels are already registered, and much of it sold at an attractive price.

The most important things we need to stimulate greater interest in better seed are higher class grading machines installed at convenient points all over the Province. Our experience, at the Kemptville Agricultural School, has been somewhat similar. The fact that the machines installed at the school were made available for the farmers in the locality, induced many of them to bring their grain in to be properly graded before sowing. It also enabled the Agricultural Society to enter the combined Standing and Threshed Grain Competition with the assurance that the produce of the registered seed used in the competition could be properly graded and sold as high class seed. The result is that the Society has almost a carload of Registered and Extra No. 1 seed for sale this year at a good margin over what they could have received by any other method. It also serves to encourage co-operative effort among the members, not only in selling their seed grain, but in many other lines of endeavour common to each member. We most assuredly need to exert greater activity in the direction indicated, if we are to maintain the standard of our crops of the Province, and it looks as though the Agricultural Societies in the various localities were the logical units to foster and encourage this enterprise.

With reference to classification of grains at shows, it appears to be a timely topic for discussion. In spite of the recognized importance of seed grain, the average fall fair does not seem to reflect it. It may be because seed grain is not naturally an attractive feature. There is little in seed exhibits to attract the eye of the average visitor at the fair. It has neither the beauty of the floral display, nor the animation of the live stock classes. Fair Boards should then realize that to make a seed show of real interest it should first be in a central location, with attractive decorative material as a back-ground; and, secondly, be placed in neat and uniform receptacles. Grain classes should be conspicuously labelled.

Where there is more than one class of the same grain, such as Field Crop Competition entries, Open Class and Registered Class, it is confusing to the observer if the various classes are not properly and clearly labelled. Where possible, attractive exhibits should be secured from Government Departments. Up-to-date grading machines can be operated, and should be, wherever space permits. It will be found that this feature will draw more interested spectators than anything else. The grain show should be planned to suit the exhibitor, and to attract the average on-looker, as well as to provide information along the lines of seed production for enquirers. As to the proper classification of grains, it should be the aim of the Fair Board to have the classification suit the locality, as much as possible. For instance, in bean-growing sections, a classification embracing the best and most widely grown varieties of beans should be made. Not only should a complete classification be given, but prize money should be more or less in accord with the value of the exhibit, and the number of farmers exhibiting.

A sliding scale might be operated without very much trouble. In areas where oats predominate in the show, attractive prizes should be given, with a

corresponding decrease in those classes in which little competition occurs. ***It may be said in a general way, that the number and quality of exhibits will depend upon the amount of Prize money offered.*** In the smaller fairs, most classifications are too extensive. The following is suggested as being reasonably well suited to the small fair.

PRIZE LIST.

GRAINS, CLOVERS AND GRASSES.

Sec.
1.—Oats, white or yellow, such as Banner or Gold Rain.
2.—Oats, early, such as Daubeney, Alaska or O.A.C. No. 3
3.—Spring Wheat (any variety).
WINTER WHEAT—ANY VARIETY
4.—Barley (any six-rowed variety).
5.—Buckwheat.
6.—Field Peas (any variety).
7.—Beans (any field variety).
8.—Red Clover.
9.—Alsike.
10.—Alfalfa.
11.—Sweet Clover.
12.—Timothy.

CORN.

Sec. *Flint Varieties.*
2.—Corn (white)
2.—Corn (yellow).

Dent Varieties.
3.—Corn (white), including W.C.Y.D.
4.—Corn (yellow).

Sweet Varieties.
5.—Corn (table variety).
6.—Corn (canning variety).

POTATOES.
1.—Green Mountain Group.
2.—Rural New Yorker Group.
3.—Irish Cobbler Group.

In the larger fairs the classification should be more extensive, but it is very easy to err in calling for too many specific varieties of grains, as many of them are not easily distinguished. Some Societies—larger ones— have special classes for Registered Grain. This has little justification, outside of providing extra prize money for the growers of this class of grain. If it is high-class grain, it should be in the Open Class and not be segregated into a special class. This observation might also apply to certified potatoes. If the Society is wealthy, and wishes to encourage more exhibits being brought out, these classes will probably be effective, but they are not justified from a standpoint of utility or economy.

The main object of the Society, as I see it, is to cut down on the number of classes, keeping it in conformity with the products of the locality, and increasing the prize money very much beyond what it is in many prize catalogues. *Concurrent with the increased prize money should be a higher standard for the exhibits. Any exhibit of grain, or small seeds, grading below Government Standard No. 2 should be disqualified.* There is no justification in bonusing an exhibitor for bringing low-grade seed to any show.

A. R. G. SMITH asked for a description of what No. 2 grade seed constituted.

MR. HAMPSON replied: Particularly in regard to the small seeds it would be difficult to give an absolute grade on it, unless you had seed grades made at the time of judging. But I would make this ruling, where anything is obviously below No. 2 it should be cut out.

MR. SMITH: If you found a bushel of oats with a few wild oats in it, would you give it a prize?

E. K. HAMPSON: I would certainly hit it pretty hard, but I would not say if there was a single wild oat found in it that I would not give it a prize, but I would give it a lower prize, and if there were enough good exhibits I would not give a prize to it. Wild oats are a scourge in the Province that we can not tolerate.

ADVERTISING FALL FAIRS

A. R. G. SMITH, NEW HAMBURG

Students of salesmanship tell us that it is important to convince their customer that they require the article offered to them, to have the prospective customer feel that the article is more valuable than the money they give for it, and that if they have it for a time they will find the article better than represented. Fall fairs are a clearing house for the year, showing by the exhibits the quality of products for the year.

In advertising fall fairs we find there are certain factors that count. Reputation of a fair has a great deal to do with the desire of the people to attend. To say you attended certain fairs is always a pleasure. When we have sailed the Mediterranean, have been presented at Court as the guest of the Governor-General, we usually mention it if occasion allows. You will notice the live stockmen casually remark that their products took prizes at certain popular fairs. Our manufactured products frequently have pictures of fair medals associated with their name. There are several ways of advertising our fall fairs. Good results usually follow the application of some principles to business in any form.

Preparation to get results from advertising depends on the class of directors and the management. Real courtesy is indispensible to any fair and directors should not be appointed unless they are all as polite as possible for gentlemen to be.

I believe the fair itself is one of the best mediums of advertising. Well balanced classification in our prize lists with a well organized police service to protect every one at the fair and to rigidly enforce the law regarding gambling or anything that may be on the verge of it, all go to advertise it.

Good accommodation for all articles whether live stock or goods makes exhibitors feel that they can safely allow their splendid stock or goods to be at the fair.

It is important to have everyone interested. It will not be a serious inconvenience to be a booster of your fair. To have the community behind a directorate is very encouraging and goes a long way toward developing local interests.

We have found valuable results from a moderate expenditure for news items in local papers. We use about eight. I have copies with me which are published during the weeks preceding the annual fair. Agricultural Societies receive a lot of publicity from reports such as were issued by the press on January 30th telling us that the Renfrew County Council refused grants this year to the Agricultural Societies, Poultry Associations and Woman's Institutes of Renfrew County. We should refrain from criticism as I am sure the report is incorrect in some way. This attitude is very much different to that of the far-seeing British statesmen who very carefully encouraged and financed the parties who were growing rubber. This source of wealth is well known to you. We believe our county councils would be well advised to increase their grants to our Agricultural Societies as promoters of national wealth. No fair should advertise anything that they are not sure of having as an attraction. Greater results follow if the public discover more than was advertised.

School children are our best advertisers. Give 1,000 school children a complimentary ticket with their name on, have them feel that they are guests of their township council and you have 1,000 boosters to awaken interest in your Agricultural Society and incidentally bring their parents with them.

Letter heads and envelopes supplied to the directors for their correspondence very effectively draw attention to the progressive spirit of a community. The old fashioned grotesque flaring bill poster is gradually moving out. It is rather difficult to get a really attractive poster.

Rural mail is a splendid medium. Prize lists are rather expensive. After members and ex-members are furnished we use a card, samples of which I have with me. These can be distributed over rural routes at a cost of 1 cent each for postage. The whole amount of postage necessary for each rural route is placed on the outside card and they are distributed in each mail box. The Department at Ottawa will supply you with the names of every post office, the number of rural routes, the number of boxes on each route within an area of 15 miles. For smaller fairs the more expensive systems of advertising are too high.

The field crop competitions allow personal touch with the organization. I am quite sure that if the director in each department—I say this advisedly—could shake hands in a welcoming way with each exhibitor it would create a good feeling. After all, we greatly appreciate the kind remarks, and we realize how far-reaching is the effort of the exhibitor who goes from our fair feeling that no attempt has been made by the officers and directors to get something specially for themselves.

FAIRS POLICY IN RELATION TO LIVE STOCK DEVELOPMENT.

H. S. Arkell, Live Stock Commissioner, Ottawa.

Some weeks ago I wrote Mr. Lockie Wilson a letter, advising him that in connection with our work we want help from the local fairs of the Province. I had the temerity to outline two or three features through which we hope that assistance might be given. Mr. Lockie Wilson very tactfully, I presume, did not attempt to discuss the suggestions I made, but proffered an invitation to come and meet the delegates of the Fairs and Exhibitions Association, as much as to say, if you can get by with this group of several hundred delegates there must be something in what you say. It may be that I shall tread on the toes of some interests here this afternoon, but I would like to make two or three suggestions for your consideration, for discussion of fairs policy.

Canada is engaged in a deliberate and comprehensive attempt to establish its position against the very keenest competition in connection with the sale and export of several lines of farm products. The competing countries—New Zealand, Australia, Denmark, the Argentine, Sweden, Norway, etc., are organizing as keenly and as determinedly as the best brains of the country can conceive, plans to help them achieve their aims. These countries are developing a system of salesmanship and production which is placing their products on a very high level in the export market. You have of course heard all this story before, but one of the promising things which can be said at the present time is that Canada is finding a very prominent place for her own products as a direct result of the system and organization that has been introduced in the last three or four years in connection with merchandising of her products. Let me illustrate: You are aware, no doubt, of the work that has been done in connection

with butter and cheese and in the marketing of beef cattle in the United Kingdom. Instance after instance could be given where Canadian cattle purchased at a lower price as compared with Scotch and Irish feeders, have netted, after they have been sold on the Scotch and English markets, a larger maximum price than the Scotch and English cattle, and that as a result of that work Canadian stock is on the increase, so that as against three years ago we have practically doubled our export.

Another thing that is worth bearing in mind is this, that while in 1919 or 1920 the margin between Canadian bacon and Danish bacon on the British market amounted to about 35 shilling per cwt. in 1925, that margin had been reduced to 5 shillings per cwt. We had improved the quality to such an extent that our Markets' Representative made this prophecy, that if we continued to improve our quality and the quantity, in proportion, in two or three years' time we would be selling on an even basis our bacon as compared with Denmark, and those of you who know the struggle we have been engaged in to beat the Dane at his game will understand what that progress means.

There has, of course, been definite co-operation with the various live stock organizations and between the Provincial and Federal Department of Agriculture. But one of the things that may not have come to your attention is this, that fairs and exhibitions have played a prominent part in connection with that activity. Some of you, no doubt, remember that two or three years ago we entered a campaign for re-organization of prize lists. You will recall, no doubt, that in connection with that re-organization there were several features introduced that caused a great deal of discussion, criticism and misunderstanding, but if you will analyze the fairs policy of four or five or six years ago as compared with the organizations of prize lists at the present time, and if you will compare the attitude of the fairs managements throughout Canada in the deliberate attempt to fashion fairs policy so that they may contribute to the upbuilding of the live stock industry, you will realize that there has been a great deal of improvement. There has been criticism and misunderstanding, but by a remarkable willingness to co-operate, by discussions that have taken place in all the provinces, there has gradually grown up an agreement that fairs and exhibitions could serve a prominent part in setting a standard, in establishing a type, concentrating attention upon market standards, market type and standards such as could be brought about by no other organization in Canada. Our larger fairs and exhibitions have organized themselves so that at the present time in connection with bacon hogs they have almost entirely eliminated the breeding and sale of any but bacon breeds.

That policy has hurt some individual breeders, it has reduced the returns in revenue in certain districts where the breeding of other breeds was carried on, but there grew up this belief and conviction on the part of those responsible for this work, that it was not worth while paying out money or concentrating attention upon a particular kind of policy when through your exhibitions you were discouraging the production of types that did not lend themselves to the production of high class bacon. Gradually, therefore, the conviction grew up that it was worth while to concentrate on this question. There has been a remodelling of all the prize lists of the Dominion in hogs, sheep, cattle and horses, with the definite purpose of eliminating breeds that had no practical or utility value.

Not only so, there have been introduced commercial classes to call public attention to the market types, the production of which was being encouraged throughout the country. Boys' and girls' classes have been introduced so that

competition is between one district and another and one province and another this has brought to bear attention upon this whole question which has raised it to a standard of live stock policy.

The fairs and exhibitions have finally accepted the responsibility of having some contribution to make in connection with the standardization of type.

To illustrate the change in type that has taken place, you can recall, for instance, in connection with the breeding of Clydesdale horses, that there was a time when the judging of these had practically no relation to other than show ring standards. There was a time when the showyard standards throughout this country had practically ruined the milking capacity of one of our finest breeds of dairy cattle. There was a time when the individual policy or haphazard methods of judging left the individual breeder or exhibitor or observer no real reason as to the kind of thing that the market wanted.

Now you can fashion for your own selves the point I want to make in this connection.

I made a statement to the Live Stock Union in Saskatoon in December that the time had come in Canada when the individual farmer had come to the conclusion that he was not his own boss as to the kind of thing he produced. That statement may be challenged. There was a time when he just consulted his own independence to the extent that he did not care what his neighbour did, but he usually found out that the following of that policy led to low profits. The fact is that we want to make money in producing bacon hogs. It is not what you or I think but what the consumer requires. If we want to make money out of growing lambs, we can't afford to sell lambs of 125 to 150 lbs. weight when the market wants 175 to 190 lbs., and we can't sell uncastrated lambs when they are worth 1 to 1½c. a pound less than when they are properly trimmed and conditioned for market.

Canada has agreed to the acceptance of a market policy. The time has come when the British, and for that matter the Canadian consumer, who eats about 80% of our product, in the last analysis determines what we produce, and there is no organization that can so concentrate attention upon the standard as the individual fairs of the country. But you must know the standard. I am not going to criticize your method of judging, but I want to emphasize the fact that when you get proper standards set for your shows you must have judges that know them.

One other thing: what do your counties produce? What are you aiming to sell? Out of what are you making your revenue? After all, those are the things, are they not, which should receive most attention in your exhibition prize lists?

Generally speaking, when you organize the prize list you think first of all of pure bred stock, and I am going to tell you that if you figure the thing out of which your people are making the money, generally you will more or less have to drastically revise your prize lists with a view to eliminating some of the breeds which are bringing in no money whatever, and, as I have said, the larger fairs and exhibitions of the country have the opportunity of creating a standard, the smaller fairs and exhibitions have one of the finest opportunities to concentrate attention of the young men and women of the areas they serve to the things that are worth while.

Are you producing hogs—those of you who represent specific areas here—and you all do—what does your fair say as regards the type which is coming to the fore in connection with your prize list? I believe if the fair sets itself to do so, in three or four years time it can result in having none but a single breed

of hogs produced in that area; and not only so, but it can result in having an improvement in the type of hogs in that particular area that it will be known all over the Province for the kind of hogs that it produces. I don't care whether you emphasize hogs or dairy cattle or chickens, the fact remains if your local fair will concentrate upon that type of product, whether it be dairy, hogs, or market cattle, or beef steers, in two or three years you will have that whole area working to the production of that particular type.

Take, for instance, the potentialities of a meeting of this kind. Supposing this were a missionary meeting, supposing you delegates go home and make up your minds that you are going to set a standard for Yorkshire pigs and Plymouth Rock chickens, for a cow that will give 10,000 lbs. of milk per year, with the organization that you have here, in three years' time you can practically reorganize the whole production system of the Province itself, and not only so, but you will relate it definitely to the Canadian national policy in the sale of a better type of product on the export market.

And that is where we invite your assistance. That is the thing that I would like to get across, that you consider this thing to the issue of where you accept a certain responsibility for the establishing in your own community a standard for breeds of market type, so that you encourage widely the attention of all the farmers in that district upon the production of that type.

Will you consider this as well, that you may easily be giving too much attention in your local fairs to prizes for pure bred stuff. After all, the greater majority of your product is commercial market stuff, it is the basis upon which all our pure bred industry is built up, and if you make it possible to devote attention in your locality to the improvement of your commercial stuff you will be doing perhaps the best possible thing, to encourage the use and purchase of high class sires.

Will you do also something else? Encourage your boys and girls. I see that you have questioned the possibility of uniting your school fairs with your local fairs. We have found in connection with our work throughout the country, nothing has been more promising than the work among our boys and girls. One of our boys in Quebec could take the cup for all Canada in all classes, in all breeds, if he were brought up. Two years ago a boy from Nova Scotia did do the same thing. I can tell you of some boys in Western Ontario who have practically led the whole community in connection with bacon hogs. Two girls from Nova Scotia took second prize as against all Canada in a competition for the judging of bacon hogs.

You have school districts, have you not? Will you introduce a prize, say for calves or chickens, where you will set one school fair against another, and have 2, 3 or 4 or 5 competing in a class of one school section as against another school section, and if there is anything that will get the attention and interest of the parents, it is a competition of that kind. I recall a Scotch boy who had come to the fore in a heifer group that we had introduced. I would like to show you the pride with which that boy's father and mother told me what that lad did. He got up every morning at ten minutes to five to milk his heifer, and the old lady said that he had not varied five minutes all summer unless the clock went wrong. And one outstanding feature of that whole question was this: that the boy's interest in the work of the farm had increased about 1,000% as a direct result of the work he was doing with his heifer and calf.

If you want to really serve your own community, I don't think there is any better way to do it than through boys and girls, and I would like to see small classes introduced between school section and school section, so that

you obtain the maximum interest. I would like to leave before this meeting this one idea: Canada has set herself to the sale of distinct market types in Great Britain. It is a huge task to meet the competition that confronts us there. The countries with which we are competing are organizing for best plans to lead them to the fore. Canada has made such progress in the last three years as to make it strongly worth the telling. We have yet a good way to go if we are going to complete our position, and if we are going to grab that market with the opportunity that it offers. And if we can't get the export trade we can't sell our product, and if we can put a quality of product on the export market so as to command the highest price it will raise the price over the whole Dominion.

Will your fairs and exhibitions, toward improving standard types, relating them to market requirements, concentrate all the attention of your people on the things I am speaking of, letting one section compete against another with the hope of raising the standard of your local community, so that it may play a large part in contributing to the success of the nation as a whole?

It was here moved by Mr. L. J. C. Bull, seconded by Harry Legge,

THAT in view of the increasing importance and popularity of alfalfa in Ontario, and that one of the common difficulties connected with its culture is in the plowing of it, this Fairs and Exhibitions Convention recommend that a joint committee be named to interview the implement manufacturers with a view to inducing and advising them in the manufacture of more suitable plow points for use in alfalfa fields, and that this committee be composed of one representative of each of the following organizations—

1—Fairs and Exhibitions Association (Jas. McLean).
2—Plowmen's Association (Ontario).
3—Ontario Seed Growers Association and J. A. Carroll of the Agricultural Representatives' Branch (J. W. Sangster).

—Carried.

Mr. Jas. McLean, Richmond Hill, was elected from this body.

Mr. McLean, the retiring president, thereupon introduced the incoming president, thanking the members for their support during the past year and soliciting the same for the incoming official.

DR. MORROW, the new president, thereupon took the chair. and thanked the members for the honour conferred upon him.

THE QUESTION DRAWER was thereupon opened. Mr. McCowan acted as interrogator and Mr. Stewart gave the replies, Mr. Wilson being final arbiter.

1. Has the Act regarding gambling, etc., at fall fairs been amended since 1924.

A.—Federal Act amended but the Ontario Agricultural Societies Act remains unchanged.

2. Should school fairs be held from the larger towns and cities and will they receive the usual benefits if they are held?

A.—In Toronto, for instance, for many years a fall fair for boys has been successfully carried on. (Broadview Y.M.C.A.)

3. Is it proper for the judging of field crops, handcraft, dairy products, etc., as well as stock to be held before the public, or should all judging be held before the public are admitted.

A.—No, judging cannot be properly done in a crowded hall. If possible, the judge should be on hand to answer questions after the judging is completed.

4. Do you consider it proper to put a man who specializes in beef cattle to judge dairy cattle or a light horseman on heavy horses?

A.—No, excepting at small fairs where only one judge for cattle and one judge for horses is employed. This is not satisfactory when a judge is required for each class.

4a. Don't you think the public would appreciate knowing who the article exhibited belonged to at fall fairs, place the name, class and section in envelope on entry ticket, and put on the envelope only class and section. The envelope to be torn off when the judging is completed, leaving the tag.

A.—Exhibitors should be allowed to put their names on their exhibits after the judging is completed.

4b. Would it be illegal to hold saddle races at fall fairs for farmers' sons only, professionals barred.

A.—It is quite all right to hold these.

5. Should Fair Boards pay their local judges?

A.—A matter to be settled by their Board.

6. Is there a ruling in the Fairs Association preventing one fair board from taking another fair board's usual dates?

A.—The Fairs Association has no control over fair dates. This has to be settled by agreement.

7. Are the baby shows found successful?

A.—Yes—finest class of live stock at the exhibitions.

8. Can a Society enter the Combined Field Crop and Threshed Grain Competition in Potatoes?

A.—No. Potatoes do not come under this.

9. On what basis is the government grant to each Society estimated? What items of the Financial Report are considered in figuring the percentage?

A.—The grant is based on the average amount of money expended for agricultural purposes during the three previous years.

10. Are beans going to be allowed to be entered in the Combined Field Crop Competition? If not, why not?

A.—No. There are no registered beans at the present time.

11. Has any Society met with better success by combining Old Boys' Union with your fair?

A.—Yes. Some Societies have made a good success of holding Old Boys' Reunions.

12. In a small country fair, is it advisable to give three prizes on stock?

A.—Yes.

13. We wish to have our school fair and big fair combined, but the president of school fair will not consent. What I would like to know has he the say, or who has?

A.—No. It has to be a mutual arrangement between the Fair Board and the Agricultural Representative.

14. How long should a party be a member before he can be on the Board of Directors?

A.—A person can become a director as soon as he pays his membership fee.

15. At our February Convention, 1925, a resolution was passed without dissent, "That the name and address of the Secretary of the Societies competing in the Field Crop Competitions would be printed in the usual report." This does not appear to have been done. Why not?

A.—The King's Printer, because of economy, failed to carry out the resolutions of the last convention. A list of secretaries may be had by applying to the Superintendent.

16. How should Agricultural Societies that fail to send in their affiliation fee of $2 be penalized?

A.—Nothing can be done.

The Hon. President of the Association, Mr. Eckardt, then addressed the meeting briefly, expressing his pleasure at being present. He remarked: the Association supplies not only the food of the world but also the brains of the world—he made this statement by virtue of the expression from thinkers that three generations of city life degenerated the race.

He referred to the fact that practically all the great men of this country and the United States were born on the farm, securing their positions through the qualifications which come to the country bred, and they were never ashamed to say they had milked a cow.

Mr. Eckhardt dwelt on the advantages to the farm lad in being brought up in an environment where there was not the excitement of the city to enter as a disturbing element into his education and general development and thinking ability.

HOW THE WOMEN'S INSTITUTES CAN COOPERATE WITH FAIR BOARDS.

BY ETHEL M. CHAPMAN, TORONTO

The reason for the co-operation of Women's Institutes or any other women's organization with a Fair Board, is to make the fair more interesting and attractive to women.

To the great crowd of women who file up and down the halls between the fancy work on the one side and the cookery on the other, it must often seem like just any other fair—the same array of bread and cakes on one side; the same crochet spreads and drawn work and embroidery on the other. And looking at the first prize loaf of bread will not make her much wiser as to how it is made; and if she does not already know how to tat she will not know how after she has looked at the bewildering collection of tatting set out for her inspection. No doubt she knows that she has seen the same pieces at every country fair for the last ten years. A lot of exhibits in the fancy work section at most of our fairs might be classed as "hardy perennials"—still there's this to be said for perennials, that you can depend on them. We might be rather disappointed if they didn't come up.

The women's department at fairs offers an exceptional opportunity for educational work in home economics—for exhibits that teach something. At the fair at Bradford, in South Simcoe, this fall the women's institutes of the district had a section of their own, and an interesting feature of this section was a competition in table setting and menu planning. The plan had been organized by the institutes as a district. One branch decorated and set a table for a Christmas dinner; one for Hallowe'en; one for Easter; one for a Valentine party; one for St. Patrick's Day and one for a Child's Birthday party. The menu in each case was made out on a large cardboard and hung beside the table where everyone could read it, and the judge was asked to explain to the people the score used in judging and the reasons for the placing of the exhibits. I don't think anyone at the fair, man, woman or child, missed this exhibit.

This display was put on in the form of a competition. A manager of a county fair in Michigan tells me that most of the exhibits put on by the Women's Farm Bureaus at their fairs are not competitive. They are entered entirely for the purpose of education. Perhaps that plan is in some respects better. If a fair board could induce all the local women's organizations—not only institutes but any women's organization—to put on an educational exhibit at the local fair just as a piece of "Women's work for Women" it would be a long step in community work. Incidentally, it would be less expensive to the fair board than a competition.

In considering special feature classes, suppose we take the three main branches of home economics, food, clothing and housing. As a food exhibit we could have a display of school lunches, of lunches for working men, of meals for young children, homemade charts showing pictures of foods children should eat and foods they should not eat. We could have an exhibit of the good and the bad market basket. One group of women might have a dairy booth with pyramids of cylindrical boxes painted yellow and ranging in size from hat boxes to pill boxes labelled to show the comparative cheese production of different countries or different provinces. I think the National Dairy Council has some posters that would be a guide in arranging such an exhibit. The same plan could be worked out in brick shaped boxes to show the butter production of the country. Posters could be used to show why people should use more milk and other dairy products. The booth could be hung with the dairy colours, white and yellow, and decorated with alfalfa or sweet clover. Another group might have an apple booth decorated with every variety of native apple and demonstrating the best methods of cooking different varieties.

This is not the place to go into technicalities, but from a health standpoint perhaps we are suffering from too much good cooking as represented in the array of cake and pastry at the average fair—and from too little knowledge of nutrition as demonstrated in what we call food exhibits. From the standpoint of the interest of the women visitors to the fair, I think there is no doubt that the food exhibits would be more attractive. The cookery entries will of course still be there, and not a bit less interesting to competitors because these other exhibits have been added as special features.

To make up an interesting clothing display for the first year, we might offer prizes for such things as the best woman's dress remodelled from a suit or coat, the best girl's school dress, the best little boy's suit, the best house dress, the best sample of millinery done by an amateur, the best specimen of repairing on any garment. At the women's institute section of the C.N.E. last year, a prize was offered for the best house dress exhibit on a living model. Nearly one hundred institutes competed. And certainly there was no doubt that the interest of the spectators was centred in the models quite as much as in the dresses. In centres where there are clothing stores it might be possible to have some of the new fall fashions displayed on models. There never was a woman yet who didn't like a fashion show; it gives a lightsome touch to the whole women's section. It is said no woman was ever known to commit suicide on the way to buy a new hat.

In cities and large towns exhibits of house furniture are usually made up by furniture manufacturers. While we cannot have this at the smaller fairs, we might offer prizes for pieces of home-made furniture. And a feature that no women's section can afford to do without is a showing of home conveniences and labour savers. If a women's organization would take this up I think that local dealers in washing machines, mop wringers, vacuum cleaners and smaller kitchen

tools, would be very willing to contribute articles as a piece of advertising. In addition to showing these the organization could offer a prize for the best home-made labour saver, not to exceed a certain cost. It would be interesting too to offer a prize for the worst atrocity in household furnishing. This was done at a house furnishing exhibit in Chicago once. The article winning second prize was a chopping bowl with hand-painted roses in the inside. The exhibit accorded first prize was a statuette of Venus de Milo with an alarm clock set in her stomach. It is not difficult to imagine what an entertaining array we might have of poor pictures and poorly stuffed birds and china footstools and hair-wreaths and other things that some enterprising souls might either pick up at home or make for the occasion.

When you have a number of women's organizations interested in various community projects it is not difficult to work up a procession of floats illustrating their specialites, a Hospital float—a Children's Shelter float—a Horticultural float.

At some other conventions we have discussed the matter of prize lists and the advisability of publishing in prize lists the scores used in judging certain articles. No doubt a women's organization would be glad to make suggestions for prize lists in the women's section, but perhaps these are already well prepared. Possibly the organization would help quite as effectively by offering a little section of "specials" of its own—covering entries for rather novel classes not in the main list, and giving prizes for these. I believe there is in many sections particular need for a "Junior Section" where the young women or senior girls can show their goods without being in competition with the more experienced women. In a few places where there are junior institutes the girls have taken this up with the fair board and the board has given them a section of their own. In one case the junior institute undertook to find the prize money itself. In another the fair board gave half the prize money and the institute the other half. In another case where the girls' funds were low, I believe the fair board procured all the prizes from public spirited people who were interested in girls' work.

Another feature of girls' work which is becoming rather popular at the larger fairs is the Girls' Household Science Judging Competition. This year, through the organization of the Agricultural Representatives, the girls in 23 counties received training in judging household exhibits and took part in competitions in their own counties. A year ago and again this year the C.N.E. held an inter-county competition, awarding all the prizes and entertaining the girls for the day. Teams of three girls each from 23 counties, entered the team competition and nearly 200 additional girls took part in an Open Competition. As it is difficult for some girls to come in from the extreme east and the extreme west of the Province, we are hoping that the fair boards at London and at Ottawa may open similar competitions very soon, and that it may not be long before we also have an inter-district competition for the girls of the North. The programme adopted last year throughout the Province was the judging of Baking, Nutrition, Sewing and Good Dressing; probably the same programme will be followed this year.

This programme is really a day's work if many girls take part, so if some of the smaller fairs were putting it on it might be well to use only part of it so that the girls might not be kept busy all day. The county competitions are organized by the Agricultural Representatives, so your county representative would be the person to get in touch with if he is not already on the fair board.

The Institutes Branch will undertake to send teachers to take care of the competition on the fair day, provided we do not have requests for too many of them on the one day.

A number of fair boards have co-operated with the Junior Institutes and Junior Farmer's Associations by getting them to provide a public entertainment on fair night, the proceeds to be divided according to whatever arrangement can be made. A number of the junior groups are giving really very excellent plays, and where the fair board can feel assured that the entertainment would be up to the standard they want, the scheme goes to encourage their home talent. It ensures a crowd too. People will go a long way to see their own friends on the stage.

In addition to making the women's section of exhibits more interesting and educational, women's organizations should be able to help to make the fair more hospitable, especially to women. Of course the women assist in a certain form of hospitality when they co-operate with the fair board in supplying meals or catering for a banquet on fair day, but there is a need beyond this. If there is one fair visitor more than another who should be taken thought for, it is the woman who comes and brings small children with her, possibly because the eight and ten-year-olds had their hearts set on coming, and there was no one to leave with the baby so she had to bring it too. I cannot think of a finer piece of fair work for any women's organization than to provide a rest room for mothers and children, and to serve afternoon tea and have bottles of milk on ice. They would probably clear expenses in this tea room, but even if they should have to make up a balance from their organization funds they could just enter it up as so much "neighbourliness." One institute reports having a Mothers' Rest Tent at their fair, with chairs for the mothers and baskets or cradles for the babies. They had asked the Department of Health to bring its Child Welfare Exhibit, and with a doctor and nurse in charge of this the scheme developed into a very busy baby clinic. The Department of Health has a very worth-while exhibit along child welfare and general health lines arranged especially to be taken to fairs, and no fair can well afford to do without it.

Of course all these projects have little to do with the actual problem of co-operation between the women's organizations and the fair officials. After all, that has to be worked out pretty much between the individuals concerned, and we are most fortunate where we have leaders with a large measure of tact, people who can get everyone working and keep them happy at it, for as Kipling says in "The Glory of the Garden."

> "Some can pot begonias and some can bud a rose,
> And some are scarcely fit to trust with anything that grows,
> But they can roll and trim the lawns, and sift the sand and loam,
> *For the glory of the garden occupieth all who come.*"

And for the comfort of those who are sometimes discouraged in their efforts to get the whole community linked up in a oneness of interest, the poet also tells us.

> "And when your back stops aching and your hands begin to harden,
> You'll find yourself a partner in the 'Glory of the garden.' "

If we can get the men and women of the community working together to make the fair not a money-making proposition and not a scheme to give publicity to either, but a sort of general community betterment affair, we will be taking another step in what might be called "applied Christianity."

REPORT OF THE RESOLUTIONS COMMITTEE

That a memorial be forwarded to the Minister of Agriculture at Ottawa requesting that all seeds imported into Canada for seeding purposes be marked when sold for such purpose with the name of the country of their origin as well as treated in some such manner as will distinguish all such seed from Canadian grown seed.—Carried.

At a meeting of representatives of the fairs in District No. 2 held in Almonte on January 15, 1926, the following resolution was adopted.

That it would be in the interest of the amusement features of all fairs if each delegate would hand in to the Secretary of the Association the name and kind of amusement that proved most successful and popular at their respective fairs as soon as possible,

(Signed) S. C. E. Dixon, Secretary Lansdowne Fair.
W. C. Young, Director, Almonte Fair.

Suggested by W. C. Young and W. West, directors of Almonte Fair, that: In the general purpose class the words after the word saddle on the 6th line to the word class on the 8th line be struck out and that the minimum weight be 1,150.

Referred to the Committee on Classification.

Moved by W. G. Merritt, Hamilton, and seconded by A. E. Culver, Simcoe, that in order to facilitate the election of Directors and to give permanency to the directorate of the local Agricultural Societies, be it resolved that the Legislative Committee ask our Superintendent, Mr. J. Lockie Wilson, to instruct the local Societies that in future Directors shall be elected for three-year periods and that one-third of the number of Directors retire each year, and that if the Legislative Committee think it advisable, they ask the Agricultural Societies Act be amended to meet this requirement.

Ruled that this is in the hands of individual Societies.

Moved by A. R. G. Smith, New Hamburg, seconded by Chas. White, Emsdale, that the District Directors of the Ontario Association of Fairs and Exhibitions be elected for a period of not less than two years. This resolution to be retroactive.

Moved by Chas. W. Molland, seconded by Jas. H. Wheaton, that we ask the Department of Agriculture to give a grant of 50% on goods donated to agricultural purposes.

Several members endorsed this move until Mr. Wilson explained that values placed on such donations had been of such uncertain quantity that the Department thought it advisable not to give grants on goods. The Societies got these goods notwithstanding, and he thought it was better to have it remain as it was.

The meeting thereupon determined to leave this as it was.

The motion of Mr. Smith re District Directors' appointment was discussed at some length. Mr. Smith felt a director should be given at least two years as he could not get around in the one year's time.

Mr. Wilson, however, explained that if this ruling was made retroactive it would leave the individual society powerless to get rid of a bad man. He felt they could easily re-appoint their good men, and get rid of the bad ones, instead of having a general binding rule. As a consequence no action was taken in connection with this resolution.

Moved by C. R. B. Hill, Murillo, seconded by C. W. Molland, Thorndale, that we tender a hearty vote of thanks to the Directors for the very interesting informative reports they have given us, also for the good work they are doing in their respective districts.—Carried.

Moved by John Dunlop, seconded by Mr. Brock, Whereas at three previous Conventions of this Association, resolutions were unanimously passed requesting the Dominion Government to have the breakable, wearable parts of farm machinery standardized, and whereas no action has hitherto been taken on this matter, we would respectfully reaffirm our request to have legislation passed by the Dominion Government standardizing the breakable wearable parts of farm machinery and put into effect as soon as possible.—Carried.

Moved by John Dunbar, St. Marys, seconded by John G. Goardley, Thorndale, and unanimously adopted by the members of District No. 8 at their annual meeting, that we request the Ontario Fairs Association at their Annual Meeting to be held in the King Edward Hotel, February 3 and 4, to endorse and carry out our request to ask the Ontario Legislature to increase their grant to the Ontario Fairs at least by $15,000.—Carried.

Moved by Chas. R. Willey, Glencoe, seconded by W. A. Brock, of Petrolia, that in addition to being recommended by five prominent citizens of the locality, all departmental judges should be recommended by the Fair Board of the locality in which they reside, and that all judges before being sent out be required to attend the Short Course at the O.A.C. in June, and all judges attending that course be examined and only judges passing that examination be allowed to act as departmental judges.

MR. BROCK felt this provision would ensure a satisfactory judge as if the Fair Board knew about him and they had their personal endorsation, they would be sure of him.

Judges at present have to attend the Short Course.

MR. CAMERON, East Kent, asked that the Department be careful to sent out men whose work has been practical rather than from a college where the work is theoretical only.

J. LOCKIE WILSON: If that resolution passes we will have to send the boys up to the O.A.C., and until they obtain a certificate you can't have any more judges.

MR. CAMERON qualified his former statement saying he did not object to college students going out provided they had practical knowledge of that locality.—Resolution lost.

The meeting stood for a moment in silent tribute after the following motion was read:

The following letter of condolence was forwarded to Mr. J. Lockie Wilson by the Ontario Association of Fairs and Exhibitions:

The Officers, Directors and Delegates to the Ontario Association of Fairs and Exhibitions have learned with deep regret of the sudden death of Mrs. Wilson and desire to extend to Mr. Wilson and his family their heartfelt sympathy.

While words cannot convey the feelings of this large body that for so many years have been under the direction of our Superintendent, we hope this letter will in at least a small way convey the heartfelt sympathy of the Provincial organization during a time of grief.

Signed on behalf of the Ontario Association of Fairs and Exhibitions,

Jas. McLean, President.

Another resolution dealt with was the notice of motion to reduce the maximum grant to Societies to $500 instead of $800. Committee made no recommendation, feeling that the floor of the House should decide this question.

A. R. Smith, New Hamburg: In view of the possible increase of our grant from $85,000 to $100,000, would it not be advisable to have this resolution withdrawn regarding the reduction of the maximum grant from $800 to $500? No action taken.

Moved by C. R. B. Hill, Murillo, seconded by Charles White, Emsdale,

That the resolution with regard to the standardization of the wearable and breakable parts of farm machinery, as passed at the 1925 convention of Fairs and Exhibitions, be again affirmed and confirmed, and that we ask our superintendent, J. Lockie Wilson, to have copies of this resolution sent forward to the Secretaries of all the Societies in the Province, for the purpose of having the members of these Societies and others sign a petition. asking immediate action on this most important and vital question, and that copies of this resolution and petition be forwarded to the proper authorities at Ottawa.—Carried.

Moved by W. G. Oldfield, and seconded,

That the words "Wild Animals" be included in the present by-laws, that is where sheep are killed by dogs or wild animals that they be paid for by the municipal council as they do at present for dogs only, and that the Ontario Department of Agriculture pay the municipality at least 75% of such money as they pay out for this purpose.

This resolution was with reference to farmers being remunerated for loss of their sheep by wolves coming from the Algonquin Park.

It was then moved and seconded that the Association recommends this and that it be sent on to the Honorable the Minister of Agriculture.—Carried.

REPORTS OF DISTRICT DIRECTORS

District No. 1.—J. F. Ault, Winchester

On account of the weather some of our Societies met with a deficit. I attended as many fairs as I could, and I found them well conducted and nicely managed. At our own fair last year we had a small deficit. Owing to the fact that we had a deficit we deviated a little from our usual custom and we ran our fair on strictly agricultural lines, and had our track lighted for night and racing at night. It was a new procedure and it worked out very well. We may not have had quite as large an attendance in the day time as if our races had been in day light, but still we had a very successful fair.

On the whole in the district over which I had charge the fairs were run clean and up to date, and with the special object in view of making them more agricultural than they ever have been before. An agricultural fair should be run along agricultural lines as closely as possible. I also believe that we should have a little relaxation, possibly a small midway, and if you have your races, it brings in a little bit of sport.

District No. 2.—P. McCollum, Almonte.

In this district twenty-four fairs are held. It is impossible for one man to visit these twenty-four fairs in one year, owing to the fact that as many as four are held on one day.

The following is a report of the fairs visited by me:—

Brockville.—There was a splendid show of cattle, swine and sheep at this fair. The showing of cattle was exceptionally good. Horse speeding is a special feature. The display of merchandise and of manufactures was splendid. There was no ladies' fancy work exhibited at this fair.

Perth.—At this fair there was a fair showing of horses, cattle, sheep and swine. Rain interfered very much with the attendance and with several special features. The Society reports the judges very satisfactory, especially the work of Miss Galbraith in the ladies' department. Horse speeding is a special feature.

Renfrew.—There was a good showing of cattle, sheep and swine. Horses are a special feature of this fair. The ladies' fancy work department was especially good. The display of merchandise was very good. This fair makes a special feature of the midway, baseball matches and horse speeding.

Arnprior.—The cattle, sheep and swine at this fair were not up to the usual standard. The showing of horses was very good, as also was the display of poultry. The display of ladies' work was good. This makes a special feature of horse speeding and the midway.

Pakenham.—A splendid township fair with a good exhibit in all departments. The showing of horses was especially good.

Almonte.—Almonte fair this year was the most successful one for a great many years. The exhibits in the live stock departments were all up to the usual high standard with a special feature being made of swine. The show in the hall was exceptionally good, every inch of available space being in use. In a financial way the fair was a success also, with a balance of $900.00 to the good for the year's work. Prospects look bright for 1926, when a four-day fair will again be held.

The secretaries of the following fairs have given me reports of their fairs and are as follows:—

Dalhousie.—This fair was at one time a prosperous township fair and always able to keep a balance on the right side. However, during the past few years conditions have changed and they are going behind each year. They find the people are not coming out to the fair as in the past, and many who come come in cars and bring nothing to exhibit. Another cause that cannot be gotten away from is the sdchool fair. Since the advent of the school fair, this fair has been going behind. The show in the hall was as good as usual, but the show of live stock was not up to the mark. They had a total of 1,200 entries.

Maberly.—Maberly fair was favoured with ideal weather this year, and although the school fair was held in connection with it, the attendance was below the average. The showing of live stock was about the same as usual; this department does not show any increase, as they find they are unable to give prizes large enough to bring out the entries. They are giving more attention to the domestic manufacture department ,and less to ladies' fancy work. This fair does not allow fakers or games of chance of any kind on the grounds. They run a dining room which is a money maker.

Cobden.—A very successful fair was held this year, everything being up to usual high standard and was also a financial success, having a balance to the good.

Wolfe Island.—The Wolfe Island fair was a successful one in spite of the fact that the weather conditions prohibited people from the mainland visiting

the island. The fair board were able to pay all expenses and have a balance to start the 1926 fair on its way. The field crop competition in connection with this fair is a splendid feature, they having from fifteen to twenty-one competing each year.

Beachburg.—This fair was very successful this year, having a splendid showing of live stock, it being much better than usual in this department. The parade of prize animals is quite a feature of this fair. The weather conditions kept the attendance below the average.

Kingston.—This fair met with extremely bad weather which interfered with the attendance to such an extent that they went behind considerable. However, the directors came to the rescue and all indebtedness was met in full.

Lansdowne.—A very successful fair was held this year and showed a good balance in the treasury. This fair spends considerable for special attractions. They have a good half-mile track and up-to-date grand stand and buildings. They are holding a three-day fair in 1926 on September 21, 22, and 23, and look forward to a very successful year.

Parham.—This fair was very successful this year, entries being up to the usual, and more money was paid out for prizes. The gate and grand stand receipts were ahead of last year, with the result that they have a nice balance to the good. The Society has purchased the fair grounds for which it has been paying out rent for some years and everything points to success in the future.

Middleville.—This is a splendid one-day township fair and this year, as in the past, made a special feature of the sheep fair.

In closing I wish to make mention of the efforts of the Women's Institutes in the displays of domestic manufacture and fancy work which they had at many of the fairs in this district.

At a meeting of representatives of different fair boards held at Almonte, January 15, 1926, it was resolved, That in the opinion of this meeting the work of the expert judges at the fairs in District No. 2 in the past has been decidedly unsatisfactory.

At a meeting of representatives of the fairs in District No. 2 held in Almonte on January 15, 1926, the following resolution was adopted.

"That it would be in the interest of the amusement features of all fairs if each delegate would hand in to the Secretary of the Association the name and kind of amusement that proved most successful and popular at their respective fairs, as soon as possible."

Suggested by directors of Almonte Fair that: In the general purpose class the words after the word saddle on the 6th line to the word class on the 8th line be struck out and that the minimum weight be 1,150.

District No. 4.—F. W. Rilance, Beaverton.

In the district which I represent at this convention twenty-five fairs were held last year. Although some Societies suffered direct loss from bad weather and all suffered indirectly from the unfavourable weather for farm work during the fall, affecting attendance, yet we had a fairly successful season.

In common with the eastern and central counties of the Province, we had an abundant crop and good pasture during the whole season, which, of course, contributed to the quality of the exhibits of both live stock and field and garden crops.

More than half of the Societies in District No. 4 hold Field Crop Competitions, mostly in oats and corn, with one or two in fall wheat.

So far as I am aware, with the exception of one or two townships in Ontario County, the Corn Borer has not invaded this district, but I think it would be well for Agricultural Societies all over the Province, not only to urge upon the government to take radical steps to prevent the spread of this menace, but to assist in every way by education and co-operation in this work.

There has been marked improvement in field crops since the inauguration of Field Crop Competitions. In one competition in my district, the judge, in handing his list of winners to the secretary said, "This is the best competition I have ever judged and that," referring to the 1st prize field, "is the best field of oats I was ever in in any competition in any year." This occurred in a district in which, ten years ago, it was almost impossible to find a field that was not infested with wild oats. A sheaf from this field was second at the Canadian National Exhibition.

While I am on the subject of field crop competitions, I would suggest that the Departmental Report containing the results would be of more service to the farmers of the Province if it were in their hands earlier in the year.

About the first of March, people begin looking about for seed grain, and if these reports were distributed before then, they would be quite a help to both buyer and seller.

Another matter which I have noticed is that during the last few years, in the report of the Agricultural Societies as printed by the Department, they have omitted the statement showing the receipts and expenditures of the fairs. This, I think, is a mistake and I would like to see the report printed in full, as formerly.

A pleasing feature of the North Ontario Fair during 1924 and 1925 was the holding of a combined Baby Show and Baby Clinic during the fair. This was held under the direction of the Department of Public Health and we were fortunate in having Dr. Phair in charge, assisted by local doctors and Miss McEwen, Public School Nurse.

In all, 23 babies were given a complete physical examination. Many questions relating to the care and welfare of infants were asked and answered, and I feel quite sure that much that was helpful and educational was accomplished.

This may seem to be outside the province of an agricultural society. But when we consider that within the last few years, the percentage of infant mortality in the cities is lower than that in the country, notwithstanding the natural advantages of the country, and when we remember the words of the Great Physician "It is not the will of My Father that *one* of these little ones should perish," we feel that after all babies are not the least important asset in this under-populated country.

During the month of December, I called a meeting of the District in Lindsay, at which a fair proportion of the fairs were represented, with the intention of forming a District Association. We discussed fair dates and the question of school fairs in connection with other fairs, and although we did not succeed in formally creating a district association, yet we spent a pleasing and profitable afternoon.

In conclusion, I want to thank the delegates from District No. 4 for electing me last year, and if I have been, or can be, of any assistance to them, I will feel that I have been amply repaid.

DISTRICT NO. 5.—R. H. CROSBY, MARKHAM.

Thirty-four Societies in the counties of Halton, Peel, York, Simcoe and Dufferin comprise District No. 5. This is a large territory for a director to cover and it is impossible to visit all the fairs. It would be advisable for the director to visit the different Societies at their annual meeting or at some regular meeting. In this way the director would get in closer touch with the officers of the Society (something that is impossible on fair day when everyone is busy) and would be of assistance in suggesting changes in prize lists, offering advice as to special attractions and special features for the fair.

From the exhibits seen at the fairs I visited, I am of the opinion that those in my district were on the whole better than usual. This was true in all classes, live stock, field and garden produce and the ladies' departments. Increased prize money at several fairs resulted in greatly increased entries in live stock. Better accommodation is badly needed at some fairs for the domestic science exhibits. Glass cases of some kind are almost a necessity for this department. The auto is an important factor in making a successful fair and many Societies will have to make an effort to provide more and better parking space. Not only is space required but some question of parking the cars whereby a quick getaway is assured at the close of the fair.

A meeting for the District was again held in Brampton the last of May with very satisfactory results. The attendance was good and many important questions were discussed. The majority of Societies now charge 35 cents at the gate. That this was of value may be seen from the report of one fair whose gate receipts were increased about $1,000 by the ten cent increase. All the Societies represented at the meeting agreed to reciprocate in publishing the dates of fairs in their prize lists. Some fairs went a step farther and advertised a list of the races, etc. in their lists. This together with more uniform classes for the speeding events certainly was of great benefit to all the fairs concerned. It was a real harmonious meeting and the delegates were unanimous in saying that it was a day well spent.

DISTRICT NO. 6.—JAMES A. TUFFORD, BEAMSVILLE.

In my district some fairs are standing still and some are going ahead.

The success of any fair depends largely on its secretary. And along with a good secretary an active board of directors, each one taking the responsibility of drumming up a particular class. For instance, one may drum up the horse classes, another the cattle classes, another the fruit and vegetable classes and so on down the list. I believe such a board of directors could make a success of any fair.

I understand a number of fairs changed their dates last year and I am sorry to say some were in my district. We had a district meeting in Hamilton in March to arrange dates of fairs, etc. We found out from each Society which dates it preferred. A committee of three was then appointed to form a circuit. All expressed themselves satisfied at the time. However, some changed their dates later, which not only made it bad for the fairs that clashed but interfered with the programme of the judges.

I believe a circuit is a splendid thing for each district, but when a schedule of dates is arranged all should stay in their places. I think something should be done at this meeting to overcome this date-changing trouble.

Since school fairs have become so numerous, I believe it would be a splendid thing to hold them and the agricultural fairs in conjunction. Many attend the school fairs who take no interest in the agricultural fairs and vice versa. By

holding them together attendance would be increased, interest widened, time saved and the young folks would grow up feeling themselves part of the Agricultural Society.

DISTRICT NO. 7.—A. E. CULVER, SIMCOE.

In making my annual report to this Association for District No. 7, I realize the inability of any director to attend more than a few of the thirty-three fairs held in our district in any one fall. Therefore my report is made up from gleanings gathered in various ways. As we all know the past fair season was visited and revisited by very inclement weather, thus retarding the usefulness of the efforts of many Societies. Several fairs were postponed, which never proves satisfactory. Too many fairs or the exhibits staged at the fair, do not in the least degree represent the production of the district it is supposed to represent. Evidently the directors have not solicited and interested the best producers of the district to prepare and exhibit the best of their production. Don't depend upon the travelling showman to place exhibits where your neighbour and yourself should place them. One fair in our district has become what their directors call it in their catalogue. "The ——— Fair and Summer Carnival," with just enough entries of agricultural products to wear the name "agricultural" but being far from an educational exhibit. Where the school fair is held in connection with the fall fair, the latter is much stimulated. One Society did not hold a show and a new Society is being organized.

On the average our fairs were well atteuded and quality good.

I observe there are many different interests in our fairs which it seems might call for the making of two groups. Group A.—Those fairs holding two or more days exhibition, other than that for receiving exhibits. Group B.—Those holding a one-day exhibit.

About the first of September I sent the following letter to the Secretary of each fair in my district:

As fair time approaches, I am taking this means of saying a few important things to you about fairs and their success.

First.—If a fair has any reason to function it must be the show window of the district it repreasents.

Second.—It must be educational in its character so that its impression will be an incentive to our fellow citizens, "the best is none too good."

Third.—The management must be unselfish, free from any petty unsportsmanship, each doing their part to make their fair the success it is obtained to be.

Fourth—Stage your exhibits in the best possible way, not only the art department or the fancy goods but the roots and vegetables, also see that the poultry and live stock are well placed so that you not only do justice to the bird or animal but to the exhibitor and judge.

Fifth.—Be courteous to the exhibitors and to the public, keeping in mind that those two make much of the success of your fair, the exhibitor furnishes your material for display and the public the money to pay your expenses.

Sixth.—Make proper classification of the exhibits asked for. As most judging is by comparison, it will be impossible for any judge to satisfy the exhibitor or spectator or even himself unless proper classification has been made when staging or entering exhibits.

Seventh.—Be a booster—talk your fair up then make it all you have represented it to be. Above all keep your fair clean and moral. Sell your membership tickets early, as this is good insurance, not only financially but in ex-

DISTRICT NO. 8.—J. A. STEPHEN, ST. MARYS.

I visited eight fall fairs and found the exhibits of each fair well filled up in all sections and the directors were a busy lost of men, which makes for the success of any fair.

The Field Crop Competition is doing good, judging by the great display of grain and sheaves at fairs which shows the good work being done, and the Department should send the very best men that can be got to judge at our fairs.

Our fair in Kirkton surpasses anything in the history of the Society. We have a purely agricultural show without any side-shows whatever, and our fair is a great success. In our baby beef contest we had some 15 calves, which were admired by all.

Our school fairs are somewhat on the decline as there are far too many school fairs held in the Province. There are 360 agricultural fairs held, and 800 school fairs. I would like to see our school fairs held in conjunction with our agricultural fall fairs which I am certain would be a success.

We held our District No. 8 meeting in Stratford on February 2nd and had a good representation from many of the Societies, which is an indication of the interest that is being taken in our fairs, and I look forward for 1926 to be the banner year of all our fairs.

DISTRICT NO. 9.—J. A. MACLEAN, RODNEY.

No. 9 District comprises the counties of Essex, Kent and Elgin, the three most southerly counties in the Province. Stretching for 150 miles along the shores of Lake Erie, and situated so far south makes it adopted to the growing of fruits, vegetables, tobacco and mixed farming. Land sells in some portions from $500 to $1,000 per acre. Essex County is noted for its corn production and its wonderful rich soil. Kent is the bean belt of the Province where it is common to grow from 25 to 40 bushels to the acre. Kent is adapted to mixed farming and tobacco is grown extensively and profitably, being able to compete with the world in barley and fruit. Elgin, like Kent, is a bean growing county, also wheat, corn, oats, fruit and dairying is carried on extensively. In an agricultural district such as this, you would expect "good fall fairs" and we have them if the weather is favourable. The weather plays a big part as to the success of any fair. General speaking, the fairs in No. 9 district last year were successful in point of attendance, exhibits and attractions were above the average. A number of fairs held the school fair in connection with their fall fair and it worked out very successfully. I would recommend the holding of school fairs the same day as the fall fair, as it creates an interest among the young, and it seems to me if our fairs of to-morrow are going to be carried on successfully, it is up to us to interest the young of to-day.

DISTRICT NO. 10.—S. B. CLARKE, HANOVER.

Grey and Bruce have a greater number of Agricultural Societies than any other two counties in Ontario. When you have 37 fairs, some of them being held for three or four days, trying to crowd into a space of three weeks, the District Director gets into trouble when he attempts to arrange conflicting dates, as each fair board is sure that they are in the right.

Some of the fairs in this district are purely agricultural, without any attractions, and the only entertainment the crowd has is to either stand all afternoon in the hot sun, watching the judging in the ring or else try and find a cool

place to sit down and chat with each other. Others, and the fair of which I am secretary, have been jokingly referred to as having only a midway. However, we get the crowd and good gate receipts, which enables us to give larger prizes, build better buildings and in other ways improve the grounds, but we do not neglect the agricultural end of it.

I doubt if any district in the Province can equal the excellent showing made in heavy draught Agricultural and Roadster horses: Shorthorn, Holstein and Hereford cattle; as well as hogs and sheep. Time and again judges have spoken to me of the wonderful exhibits of sheep they find at the fairs in our district. The exhibits of grain, vegetables and fruit are above the average, many of our exhibitors winning prizes at the Guelph Winter Fair and Royal Show last fall.

In the ladies' department the showing is exceptionally good, but, as in many other districts, many of the pieces have been there so often that we consider them heirlooms.

District No. 11.—G. W. Miller, Gravenhurst.

I have been able to visit only a very small number of the fairs in this district including the Gravenhurst and Muskoka fair, which was held September 10-11th, and of which I have been a director for some years. It is improving each year. The attendance in 1925 was a little below the average as the weather was threatening. The people seem to be taking more interest than in former years. There is a slight falling off in the exhibits of horses, especially in the light classes. The entries and exhibits of cattle are getting better each year and some very good animals are shown, also some pure bred ones of a good type, Sheep and swine, while not numerous, are very good, and a credit to the owners.

Poultry are also growing in numbers of entries and some nice birds are exhibited, quite a few pure bred.

Dairy products are good and are increasing in number of entries each year. The prizes offered for the children's department is growing in interest. Entries in the ladies' department are also increasing, especially in cooking and canned fruit.

On September the 18th I visited the South Muskoka fall fair held in the town of Bracebridge. This an excellent show and well managed. I understand that when auditors closed the books at the end of the year the report showed a balance on the right side of the page of nearly $1,000. This is a three-day fair and has all modern conveniences such as horse stables, poultry houses, sheep and swine pens and cattle sheds, and here again there seemed to be a falling off in the light classes of horses but a good showing of heavy and agricultural horses. In cattle I found a good number, nearly all breeds being represented, with pure breds and many of such a type as would do justice to any show ring.

In the case of roots and vegetables this fair shines and has a very large entries in all classes, especially in potatoes. There was a nice exhibit of fruit of a superior quality. Grain was well represented in nearly every variety and some registered grain was shown. Dairy products were of a very high class and worthy of special mention. In the ladies' department canned fruit was excellent, also the cooking and other work of the ladies.

On September 23rd I visited the Stephenson and Watt fair. This is held in the village of Utterson. This is a very nice country show and the people seemed to take a very keen interest in this fair. Some very splendid exhibits in nearly every class. Horses were very good and some fine ones were exhibited. The hall was well filled, and the most outstanding exhibit was the sheaves of grain.

They were of a splendid appearance and well filled with good grain. The dairy products were very numerous and good. The ladies here, like elsewhere, seemed to excel in their ability to look after the canned fruit department. One other outstanding end was the school children's exhibits. The Society offered prizes for the different schools, one for under a given number of pupils and another class for schools over the given number. Each school was in charge of the teacher. This feature created much interest and was of an inspiring nature.

On September 25th I visited the North Muskoka fall fair, which was held in the town of Huntsville. The weather was fine and the attendance good. The cattle exhibits were of an excellent quality, and a good number of pure bred animals would be a credit in any show ring. A very nice showing of horses in all classes. Sheep and swine were not very numerous, but some good ones were exhibited.

The hall was too small to do justice to the exhibitor. Quite a bit of crowding, and this does not tend to the best interest of the exhibitor. All classes seemed to be well filled. There was a very fine lot of poultry on exhibition.

District No. 12.—John MacFarlane, New Liskeard.

The fall fairs and exhibitions throughout this district were better during 1925 than ever before. Many of our Agricultural Societies have made efforts to get beyond the old time systems and have put more energy into building up the annual fairs, thereby making them more attractive for visitors. It is very gratifying to know that the people are still very much interested in the local fair and turn out to see the exhibits with all the zest of former years.

Residing as I do in Temiskaming, or "The Clay Belt" as it is commonly called, it might be of interest if I pointed out the direct beneficial effects of our Agricultural Society. For the past three years one Society has held a combined Field Crop and Threshed Grain Competition and practically all societies are holding the regular Field Crop Competitions. The result has been that some of our farmers have been successful in growing almost perfect Marquis wheat and high-class barley and peas. It is a pleasure to report that through these competitions and our fall fairs, Temiskaming has proved itself capable of competing against the world for honours in the growing of grain. At the International Grain and Hay Show held at Chicago during the same time as the International Exposition during the first week of December, a Temiskaming entry carried off 5th prize in Field Peas. Temiskaming also made rather spectacular wins in Barley at Toronto and Ottawa. At the Royal Agricultural Winter Fair the 3rd and 6th prizes in open competition in Barley, with 42 competitors from all over Canada, came to Temiskaming. It was, however, at Ottawa that the greatest showing was made. Here we find that First Prize and Championship, 5th, 6th, and 9th prizes in Barley came to local growers. The 5th, 9th, and 10th prizes in Spring Wheat, 2nd prize in Registered Spring Wheat, 2nd prize in Early Oats and 4th prize in Field Peas were all carried off by local growers at Ottawa. The most tangible result of the Combined Competition in Barley is the economical value which it is proving to be to the farmers. Many of our farmers as a result of growing this barley from Registered seed and having it graded as Registered, have been able to market their product to the Canada Malting Company at a premium of 50c per bushel for Registered, and 35c per bushel for extra No. 1 over the regular market price. In other words, these successful farmers are getting from $1.10 to $1.25 per bushel for their barley. Had it not been for our Agriculural Society these farmers would still be growing inferior grain.

Another feature of particular interest is that one Society has introduced the offering of Silver Cups in at least two classes. In 1925 these were for the Champion Horse of the Exhibition and for the best Home Garden. The cups were donated locally and a great deal of interest was shown in competing for them. It is the intention of this Society to again offer cups. This feature is very commendable inasmuch as the cups are of lasting value.

The live stock shown at our fairs has all been of good type and conformation, and while the quantity shown can be enlarged, improvement is made each year.

I consider our Agricultural Societies are well worth the efforts we have to make to keep them in a flourishing condition.

District No. 12.—F. C. Wagg, Mindemoya.

On Manitoulin Island where I live we have five fall fairs and about a dozen school fairs. In Algoma and Sudbury districts, there are twelve fall fairs. Nearly all of these are what are called small fairs. Some of them have tried uniting the school fair with the regular fall fair and it seems to be a success. In Gore Bay they had the school fair on the first day of the fall fair and on the second day they held a district school fair where all the best from each school fair on the island was shown. That was like three fairs combined in one. It made a fine show. The president told me it was the best in ten years. Kagawong combined the school fairs with the fall fair and they also made a success of it. Too many of our fairs up there are just running along year after year in the same old rut, and nearly all of them are having trouble to raise money enough to carry on.

Last fall, Manitowaning raised their admission fee to 50c. They claim it paid and I believe it did for one year, but next year they will wonder where all their crowd is. One man who went from our village says he won't take so many in his car another year. Another man took his whole family and it cost him $3.50 admission fees. He says they will all stay home next fair time. I believe that 50c. admission fee will hurt that fair for years to come.

Last year I told you I thought the school fair hurt the fall fair, as the school fair is free and the regular fair is not. This year I can tell you another side of the story. One of our members at Providence Bay told me it was through his children taking part in the school fair that led him to take an interest in the larger fair, and at our last fair that man had a good number of exhibits and won a fair share of the prizes. The school fair was a help to us and I believe many of our small fairs help the larger ones in the same way.

One good thing the fairs are doing is teaching the people that quality counts for more than quantity. That the small or fair sized vegetable that is of good shape and quality is worth more than those that are large and rough. The same rule applies to live stock. The big rawboned animal is not wanted anywhere. People can eat beef or butter but they cannot eat bones.

I have tried to get the opinion of the officers of the Societies in our district on uniting two or more small fairs. One president was in favour of it if they could have the united fair in his town. I have talked to a number of men on uniting and they are strongly opposed to it. They do not think that exhibitors would come far enough to make it a success.

I wrote a letter to nine Societies in our district but they seem to take so little interest in our convention that I did not get a single reply. I believe in some cases they can hardly afford the expense of sending a delegate but there is no reason why they cannot write. They do not seem to care anything about

the work Mr. Wilson or this convention is doing for them, so long as their grants keep coming along. Our own Society decided to send a delegate, but the man elected decided not to go when it was too late to appoint another one.

In dealing with the small fairs, such as we have in our district, I think the two main questions are how to raise money enough to carry on and how to get them out of the old ruts and make their fairs better each year. If we could make our small fairs better (and I believe we can), I do not think we will have any trouble over the question of funds.

DISTRICT NO. 12 (WESTERN DIVISION).—E. T. ROSS, PORT ARTHUR.

There are seven fairs in this part of District 12. All of them were successful from an exhibitor's point of view but rain and cold weather were responsible for a lessening of gate receipts.

All of these fairs are doing good work in the upbuilding of the agricultural section of that new country. The display of roots and vegetables will compare favourably with that of any other fair in the Province. In cattle, horses, sheep, swine we are improving year by year. In fruit we usually have a fairly good display of orchard apples, crab apples and small fruits of all kinds, and last but not least, in ladies' work and dairy products we have an exhibit that will rival any similar in Ontario or the Dominion of Canada.

Some school Fairs are held in conjunction with the agricultural fairs, others separately. In all cases the Societies place their grounds at the disposal of the school fairs.

In the newer districts of this Province of ours, the Agricultural Societies play an important part and one of the most important points of education are our Field Crop Competitions which are well patronized in our districts.

A. R. G. *SMITH, NEW HAMBURG, HONORARY DIRECTOR.*

The good work of the Agricultural Societies of Ontario cannot be estimated by anyone, and we appreciate the requests made by a community desiring the formation of an Agricultural Society. During the past year sections in Western Ontario as well as Eastern Ontario have taken up the work and are asking for suggestions regarding the organization of fairs. I had the pleasure of addressing the Board of Trade and several other associated organizations in the town of Waterloo during the early part of January. That we may reasonably expect the organization of an Agricultural Society in that town by the business men associated with the representatives of the splendid agricultural district surrounding it seems quite certain. The other Agricultural Societies in Waterloo County will be most happy to assist in any possible way.

I am convinced that more meetings of our Agricultural Societies could be held during the year with representatives of other Agricultural Societies as their guests to bring messages of good will and possibly some suggestions of competition that would stimulate an interest in some agricultural work of profit. I have in mind a suggestion made to an Agricultural Society in Western Ontario regarding a competition for turnips which will be valuable in a county noted for the production of splendid turnips, sold largely in United States markets. I find that our Agricultural Societies have many serious problems, especially finances.

I would recommend letters from the judges to the directors regarding improvements in their prize lists and to the local newspapers of the classes they had judged and where improvements could be made. After all we find outsiders can see many features to admire which we do not appreciate ourselves.

SUGGESTED CLASSIFICATION FOR PRIZE LISTS FOR TOWNSHIP FAIRS

HORSES

PURE-BRED CLASS—Open to pure-bred horses only of all draught breeds:
- Stallion—Three years or over;
- Stallion—Yearling and two year old;
- Brood mare;
- Foal;
- Mare—Yearling; two year old; three years old or over.

GRADES OR CROSSES CLASS—Open to grades or crosses only, of the draught breeds:
- Draught—
  - Brood mare;
  - Foal;
  - Yearling mare or gelding; two-year old mare or gelding; three-year old mare or gelding.
- Express or Waggon—
  - Brood Mare;
  - Foal;
  - Yearling mare or gelding; two-year old mare or gelding; three-year old mare or gelding.

HARNESS CLASS—Brood mares not eligible in this class:
- Heavy Draught Teams—3,200 pounds and over;
- Light Draught Teams—under 3,200 pounds;
- Express or "Waggon" Teams;
- Single Express or Waggon—mare or gelding.

CHAMPIONSHIP—Open to prize-winners, mare or geldings in the pure-bred, grades and harness classes.

LIGHT HORSE CLASS:
- Stallion—Pure-bred; three-year old and over; yearling and two years old;
- Brood mare;
- Foal;
- Yearling mare or gelding; two-year old mare or gelding; three-year old mare or gelding.

HARNESS HORSES:
- Pair—mare or gelding;
- Single carriage—mare or gelding;
- Single Roadster—mare or gelding, 15.2 or over;
- Single Roadster—mare or gelding, under 15.2;
- Saddle Horse—mare or gelding;
- Hunter—Three years old or over, mare or gelding; shown on halter, best type to make a hunter.

SPECIALS:
- Pony in harness—14.2 and under;
- Lady driver;
- *Gentleman's turnout.*

EXPLANATION

In many districts there are not a sufficient number of pure-bred horses of any one breed to provide competition which would justify classes for each breed. On the other hand, it is not desirable to allow pure-bred horses to compete against grades or crosses as it tends to discourage farmers from bringing their horses into such competitions.

It is, therefore, desirable to provide a class for pure-breds at nearly all fairs, in most cases making one class open to all pure-breds of the draught breeds—Clydesdale, Percheron, Belgian and Shire. In some districts there may be enough pure-bred horses of one breed to provide competition and to justify a class for that breed.

By having a separate class for grades and crosses of the draught breeds, from which registered stock is barred, farmers are encouraged to bring their horses to the show and this serves two good purposes. It makes all farmers take more interest and helps to make the show larger. It is advisable to make the prizes in these sections as liberal as the finances of the association will permit.

Many of the terms that have been used in describing different sections, such as "agricultural," "farm chunks," "general purpose," etc., are not descriptive of the horses as they are in demand for sale. To simplify the terms it is recommended that "draught" and "express and waggon" horses be used.

In the light horses it is as a rule desirable to have only a pure-bred section for stallions, and this is the only class in which they should be permitted to show. All other classes to be open to all breeds, grades or crosses of the light horse breeds, except ponies 14.2 and under, for which a special class is provided. Any kind, weight, or height of horse, not a pony, is eligible for the carriage class. It is well to divide roadsters into two sections according to height.

A classification such as suggested will permit all horses produced in a district to compete at the fair without unnecessary duplication. By not having more sections than are necessary to accomplish this purpose the fair management will be enabled to allot the prize money to much better advantage in the interest of the district that the fair serves.

CATTLE

PURE-BRED CLASS:

- Bull—Three years old or over; two years and under three; one year and under two; calf—calved on or after September 1st of previous year.
- Cow—Three years old or over.
- Heifer—Two years and under three; one year and under two; calf—calved on or after September 1st of previous year.
- Herd—One bull and three females.
- Get of Sire—Three animals, males or females, three years of age or under, the get of one sire and owned by exhibitor.
- Champions and Reserve Champions—
  - Bulls—Of any age, first and second prize-winners in above sections;
  - *Females—Of any age, first and second prize-winners in above sections.*

COMMERCIAL CLASS:

- Cow—Open only to grades or cross-breds of any age being in milk, or showing well gone in calf.
- Heifer—Grade or cross-bred; two years old and under three; one year old and under two; Calf—calved on or after September 1st of previous year.
- Herd—Pure-bred bull and three grade females.
- Steer—Open to pure-breds, crosses and grades.
  - Heavy—1,200 pounds and over;
  - Handyweight— 900 pounds to 1,200 pounds.
  - Baby Beef—600 pounds to 900 pounds.
- Champions and Reserve Champions—
  - Female—Of any age, first and second prize-winners in above sections.
  - Steer—Of any weight, first and second prize-winners in above sections.

SPECIAL CLASS:

Boys' and Girls' Calf Competition—Open to boys and girls fifteen years of age or under, exhibiting calf, calved on or after January 1st of current year. Calves to be owned by the exhibitors or by their parents or guardians. Competition to be judged on merits of the calf.

EXPLANATION

The classification suggested may be used for both beef and dairy classes (except the steer section for dairy) and for each breed of these classes when there are sufficient numbers of each breed to make separate classes for each desirable. In many districts it will only be advisable to have sections for the one or two

breeds of the beef or dairy classes which are produced in sufficient numbers to make competition in such classes. Another section may then be provided where all other beef breeds, for which separate classes are not provided, could compete together or similarly for other dairy breeds.

In some districts where there are very few pure-bred beef cattle or very few pure-bred dairy cattle produced it is advisable to provide only one class where all the breeds of beef cattle or all the breeds of dairy cattle, as the case may be, can compete together and to provide full classes for the kinds of cattle produced in the district. That is, in dairy districts full classes for dairy cattle should be provided and a combined class for beef cattle, or vice versa.

Some confusion arises at fairs from time to time regarding the age limits for a calf. September 1st of the previous year has been adopted by nearly all large fairs and it is desirable that this standard date should be generally adopted.

The commercial class should often be the most important end of the cattle show because it is this class of cattle that most farmers produce. Prize money should be as liberal as possible in this class. Combining some of the less important pure-bred classes will make this possible.

The idea in the herd section of the commercial class is to permit farmers having a pure-bred bull and a creditable grade herd to exhibit them in competition. It is advisable to confine this section to either beef herds or dairy herds or to provide two sections, one for beef herds and one for dairy herds.

The steer section suggested should call for finished beeves, but it may be desirable in some districts to add a section for feeder cattle. The terms adopted to describe the steers are those used on public markets.

In order to interest the future exhibitors it is very desirable to have a special class for a boys' and girls' calf competition. It is not advisable to make the rules too strict as to eligibility for entry although such rules as are made should be enforced. The main object, however, is to get the boys and girls interested in exhibiting at the fair and in producing something each year with the object of exhibiting.

SHEEP

Section 1—Ram, two years and over;
Section 2—Ram, yearling;
Section 3—Ram, lamb;
Section 4—Ewe, two years and over;
Section 5—Ewe, yearling;
Section 6—Ewe, lamb;
Section 7—Flock—to consist of one ram; two ewes one year or over; and two ewe lambs.
Champion Ram.
Champion Ewe.
Commercial Class—Two ewe or wether lambs, market standard governing.

The above are for any breed common in the district where the fair is held.

NOTE.—In sections of the Province where few pure-bred sheep are raised, it might be well to have grade classes for Nos. 4, 5, 6 and 7 as above, and pure-bred classes for Nos. 1, 2 and 3.

SWINE

BREEDING CLASSES:

Yorkshires: Section 1—Boar, twelve months and over;
Section 2—Boar, six months and under twelve months;
Section 3—Boar, under six months;
Section 4—Sow, twelve months and over;
Section 5—Sow, six months and under twelve months;
Section 6—Sow, under six months;
[illegible]

SWINE—*Continued*

Berkshires: Section 1—Boar, twelve months and over;
Section 2—Boar, six months and under twelve months;
Section 3—Boar, under six months;
Section 4—Sow, twelve months and over;
Section 5—Sow, six months and under twelve months;
Section 6—Sow, under six months;
Section 7—Sow and litter, not less than six pigs.

Tamworths: Section 1—Boar, twelve months and over;
Section 2—Boar, six months and under twelve months;
Section 3—Boar, under six months;
Section 4—Sow, twelve months and over;
Section 5—Sow, six months and under twelve months;
Section 6—Sow, under six months;
Section 7—Sow and litter, not less than six pigs.

NOTE.—In a few special districts it may be advisable to add classes for Duroc Jerseys and Chester whites, giving two-thirds of the amount of prize money as given for the three bacon type classes.

COMMERCIAL CLASS:

Open to any breeds or crosses of breeds of bacon type hogs, 180 to 230 pounds.

Section 1—Six bacon type hogs shown by one exhibitor, weight of each 180 to 230 pounds, to be judged according to bacon hog standards.

Section 2—Bacon type hog, weight 180 to 230 pounds, to be judged according to bacon hog standards.

POULTRY

(Give Society's Rules Governing Poultry Exhibits)

Time of entry and time of removal. All classes A.O.V. must be standard bred. Entry fee. Prize money for each class.

	Cock	Hen	Cockerel	Pullet
1. Wyandottes—white	......	......	......	......
2. " buff	......	......	......	......
3. " silver laced	......	......	......	......
4. " partridge	......	......	......	......
5. " A.O.V.	......	......	......	......
6. Plymouth Rocks—barred	......	......	......	......
7. " white	......	......	......	......
8. " partridge	......	......	......	......
9. " A.O.V.	......	......	......	......
10. *Rhode Island Reds—single comb*	......	......	......	......
11. " " rose comb	......	......	......	......
12. Rhode Island Whites—rose comb	......	......	......	......
13. Jersey Black Giants	......	......	......	......
14. Brahmas—light	......	......	......	......
15. " dark	......	......	......	......
16. Cochins—black	......	......	......	......
17. " white	......	......	......	......
18. " A.O.V.	......	......	......	......
19. Langshans—black	......	......	......	......
20. Leghorns—Single Comb—white	......	......	......	
21. " " buff	......	......	......	......
22. " " brown	......	......	......	......
23. " " A.O.V.	......	......	......	......
24. " Rose Comb—brown	......	......	......	......
25. Minorcas—Single Comb—black	......	......	......	......
26. " —A.O.V.	......	......	......	......
27. Dorkings—A.V.	......	......	......	......
28. Campines—silver	......	......	......	......
29. " golden	......	......	......	......
30. Orpingtons—black	......	......	......	......
31. " white	......	......	......	......
32. " buff	......	......	......	......
33. Sussex—A.V.	......	......	......	......
34. Cornish Games—dark	......	......	......	......

POULTRY—*Continued*

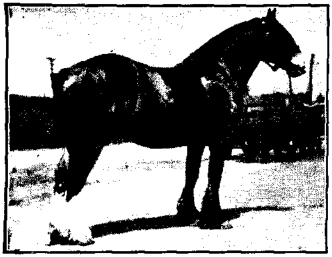
	Cock	Hen	Cockerel	Pullet
35. Red Caps	......	......	......	......
36. Andalusians—blue	......	......	......	......
37. Anconas—rose or single comb	......	......	......	......
38. *Spanish—white faced black*	......	......	......	......
39. Buttercups	......	......	......	......
40. Polish—white crested black	......	......	......	......
41. " A.O.V	......	......	......	......
42. Hamburghs—black	......	......	......	......
43. " *golden spangled*	......	......	......	......
44. " silver spangled	......	......	......	......
45. " A.O.V	......	......	......	......
46. Houdans—A.V	......	......	......	......
47. Turkeys—bronze	......	......	......	......
48. " white Holland	......	......	......	......
49. " A.O.V	......	......	......	......
50. Geese—Embden	......	......	......	......
51. " African	......	......	......	......
52. " A.V.—Chinese	......	......	......	......
53. " *Toulouse*	......	......	......	......
54. Ducks—Rouen	......	......	......	......
55. " Pekin	......	......	......	......
56. " Aylesbury	......	......	......	......
57. " Indian Runner	......	......	......	......
58. " A.V.—Muscovy	......	......	......	......
59. Modern Games—A.O.V	......	......	......	......
60. Old English Games—A.O.V	......	......	......	......
61. Ornamental Bantams—A.O.V	......	......	......	......
62. Game Bantams—A.O.V	......	......	......	......
63. Any other variety not classified	......	......	......	......
64. Bred to lay Pens—heavy breeds—1 cock—4 hens				
65. " " light breeds—1 cock —4 hens				

(Rabbit classes and Pigeons)
(Cavies classes to suit requirements.)

CUTS FOR PRIZE LISTS

WITH a view to the better illustrating of Prize Lists for Agricultural Societies in connection with Fairs and Exhibitions, we have arranged for the supply of Electrotypes of any of the following Breeds, postpaid, at 70 cents each.

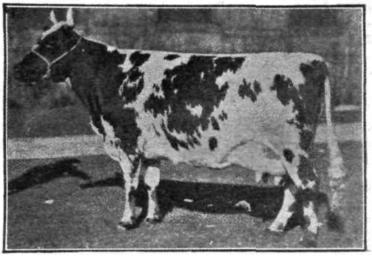
J. LOCKIE WILSON.



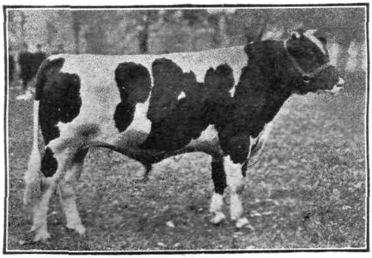
Clydesdale.

Standard bred.

Percheron.

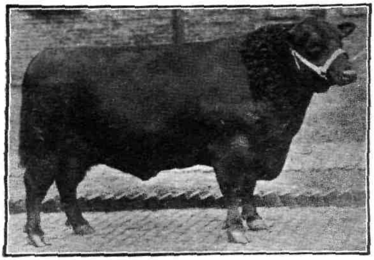


Ayrshire.

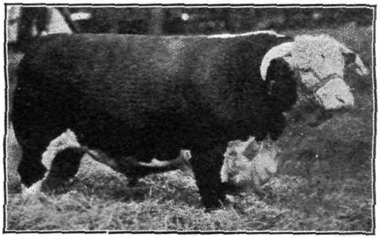


Holstein.

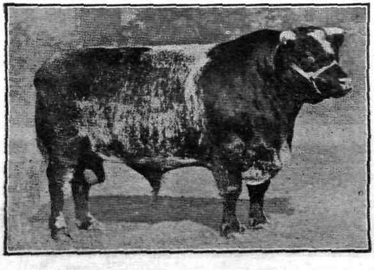
Jersey.



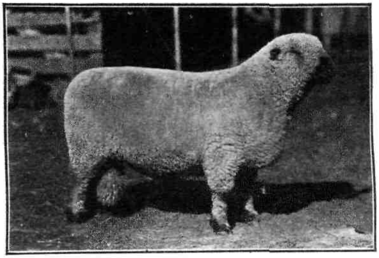
Aberdeen-Angus.



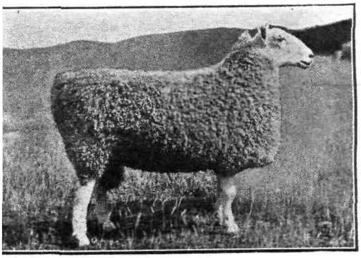
Hereford.



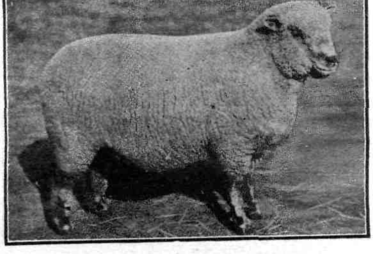
Shorthorn.



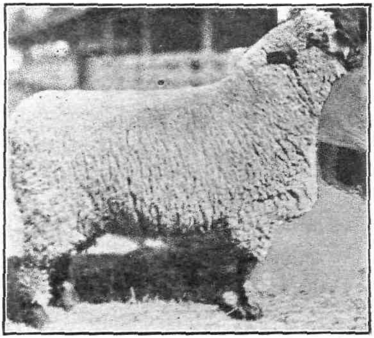
Shropshire.



Leicester.



Southdown.



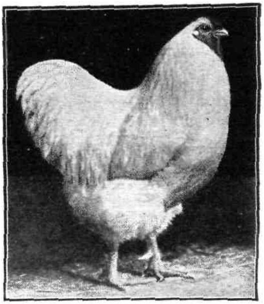
Oxford down.

Yorkshire sow.

Yorkshire boar.

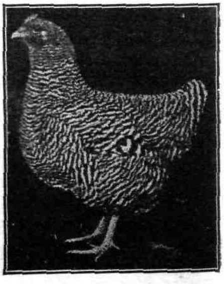
Berkshire sow.

Berkshire boar.



White wyandotte.

White leghorn.



Barred rock.

Ontario Department of Agriculture

TWENTY-SECOND ANNUAL REPORT

OF THE

Vegetable Growers' Association

1926

PRINTED BY ORDER OF

HON. J. S. MARTIN, Minister of Agriculture

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

ONTARIO VEGETABLE GROWERS' ASSOCIATION

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Second Vice-President—JOS. CYR, Cyrville.

Secretary-Treasurer—J. LOCKIE WILSON, Toronto.

Honorary-Director—F. F. REEVES, Humber Bay.

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Representative to Canadian National Exhibition—J. RUTHVEN WILSON, Port Credit No. 2.

Representative to Central Canada Exhibition—CHAS. WATT, Victoria Street, Ottawa.

Representative to Royal Agricultural Winter Fair—CHRIS FRETZ, T. K. AYMER, Humber Bay, and W. J. COOKE.

ONTARIO VEGETABLE GROWERS' ASSOCIATION

FINANCIAL STATEMENT

December 1st, 1925 to November 30th, 1926

RECEIPTS

Balance on hand from 1925	$717 26	
Membership Fees	564 50	
Field Crop Competition Entry Fees	242 00	
Garden Competition Entry Fees	35 00	
Grant	900 00	
Refund from Field Man	40 00	
Interest from Bank	21 33	
Subscription to Scuffler from Dunnville Branch	50	
		$2,520 59

EXPENDITURES

Printing	$11 25	
Auditor	5 00	
Postage	25 00	
Expenses of speakers to Meetings	86 15	
Advanced to Field Man for Travelling Expenses	40 00	
Convention Expenses—Badges, Banquet, Entertainers, etc	102 41	
Membership Prizes, 1925	23 00	
Exchange on cheques	80	
Fee to the Canadian Horticultural Council, 1926	75 00	
F. C. Rogers, subscription to Scuffler from Dunnville	50	
Paid for Garden Competition Prizes	216 00	
Paid for Field Crop Competition Prizes	540 00	
Printing Membership Tickets	38 00	
Petty Cash	5 00	
Stationery	38 25	
Expenses re Canadian National Exhibit	27 50	
Directors Meetings, expenses etc	586 38	
Balance on hand	700 35	
		$2,520 59

ONTARIO VEGETABLE GROWERS' ASSOCIATION

22nd Annual Convention, Toronto, February 9th, 1927

PRESIDENT'S ADDRESS

W. J. Cooke, Kingston

I welcome you to your annual convention. Make it the clearing house of the knowledge gained during the past season, and present any questions you wish answered on difficulties that you may have experienced. Make this convention a valuable one, as we have with us many of the most practical growers who will willingly tell their experiences to you and their methods of crop improvement.

The past year has been one of continued endeavour on the part of your executive. The requirement for adequate protection for our industry has become more acute and our requests in this regard have been vigorously carried on. In conjunction with the Horticultural Council, we have presented our case very forcibly to the Tariff Advisory Board and received a very courteous hearing. It rests with them and the Government at the present time for deliberation.

I wish to express my appreciation of the work of Mr. Cecil Delworth and Mr. Jos. Cyr on this tariff question. Their efforts have been untiring and most of the credit is theirs.

Our French and British Columbia growers are now co-operating with us very satisfactorily in tariff matters and in this we place great confidence.

The need of the Horticultural Council and of our continued membership is very plain to me. Without a unanimous appeal from all horticultural interests before the Tariff Board our requests would have been very coolly received and our hearing would have been futile.

Much remains to be done in educating the consumer who has a wrong conception of our ideas on tariff. We should have speakers present our case honestly to Rotarians, Kiwanians, Boards of Trade, Women's Institutes and other intelligent organizations because the consumer with enlightened economic ideas will not be against us when they understand us and they will form a nucleus to spread our viewpoint to the mass of consumers in our towns and cities.

Our experimental stations have done much for us in the past and much is still undone. We have profited greatly from their research work on better varieties, improved methods of fertilization and to some extent, in spraying.

In this latter department, much is yet undone. The downy mildew of onion, so disastrous in some sections is open for much experimenting. Knowledge is very difficult to obtain on the action of the fungus causing celery blight. We want to know under what conditions of heat and humidity it is active; how it is spread from section to section, how long it remains in the soil and a complete life history of this fungus disease, so disastrous to one of our major crops. It is only when a grower understands these items, that he can spray economically and efficiently.

The growing of Wonderful lettuce without tip burn is another very vital question for which we ask some experimental work.

CHRIS FRETZ, Vineland Station
President O.V. G. A.

The spreading of disease on seeds, causing no doubt untold injury to the growers through introducing diseases in their gardens, hitherto unknown in that section, should be widely published with methods of control which have now reached a rather satisfactory stage of experiment.

As an organization, we want to express our appreciation of our member Mr. Jas. Little of St. Catharines, who has brought great honour to our Province and our Association by winning the first prize on celery against all America at the last annual convention of the Vegetable Growers of America. This has been a great support to us in our tariff talks as it shows that it is not our poor production methods that give our southern neighbours an advantage on our market.

Our organization has prospered during the past year under the able guidance of our secretary, Mr. Lockie Wilson, and the energetic endeavours of our organizer, Mr. Geo. Rush. What the future holds will be of our own making. As we co-operate, we will succeed because if you note the successes of any business men, any trade organizations, union labour or wheat pool, you will see that it is only as their members show a consistent spirit of co-operation that they succeed and receive financial reward for themselves and become a recognized power in the land.

REPORT OF THE SECRETARY-TREASURER

J. Lockie Wilson, Toronto

If any class of men deserve a fair return for their incessant work day in and day out throughout the seasons, it is the market gardeners of Ontario. Subject to unfair discrimination by our neighbours to the south of us, in their tariff laws, to meet which they are at a great expense in fuel and labour, it is only by the strictest attention to business and economy that they can make both ends meet. The Dumping Act up to the present time has been an absolute failure and the products imported into this country are valued at the point of production rather than at the port of entry. This is not as it should be. We sent two delegations to wait on the Tariff Commission and our case was well put, particularly by Mr. Cecil Delworth and his address was favourably commented on, but up to date no action has been taken.

A number of new branches have been organized and the membership has been well maintained. The field crop and garden competitions have been as popular as ever, in spite of the fact that the season was so backward. The exhibit of vegetables at the C.N.E. and the Royal have never been excelled. We were given a splendid location in the new Ontario Government Building at the C.N.E. and Ontario products were much admired by the tens of thousands of people who passed through the building. The prizes awarded for the branch exhibits were $75, $60, $50 and $40. It is hoped that many more branches will take advantage and compete for these large prizes during 1927.

I am sure you are pleased to note that at the American Vegetable Growers' Convention held at Cleveland, Ohio, this fall, Mr. Jas. Little of St. Catharines, won the Grand Championship in Celery, and Mr. Klass de Jong, another Canadian who resides in Manitoba, won the Grand Championship for Cauliflower, showing that even in the finer classes of vegetables Canada stands first.

Through the efforts of our Association, we have arranged to have an investigation into alleged combines in the distribution of fruits and vegetables

produced in Ontario. Mr. Lewis Duncan, who did such good work for the vegetable growers of British Columbia in investigating the combines and unfair proceedings of commission men in that Province was appointed to take charge of a similar investigation in Ontario, and his report has been issued. It shows the magnitude of the fruit and vegetable crops in Canada. There was produced in Ontario alone in 1920, $24,599,790, of which $10,127,815 were for vegetables.

Ontario Growers ship a quantity of their vegetables to Montreal and in this connection the commissioner strongly suggest that some small commission houses make a practice of defrauding the growers. The commissioner refers to the ineffectiveness of the Toronto St. Lawrence Market. In the transactions of the Toronto Fruit Market the average gross profit of the retailer was found to be 56 per cent. of what the goods cost him. The minimum gross profit on any one transaction was 20 per cent. of cost and the maximum 114 per cent. Out of every $100 paid by the consumer the retailer retained $36; the commission merchant, $9; the transportation company, $10; and the grower, $45. The City of London, Ontario, should be congratulated on having, according to the commissioner, the best public market in Ontario, being centrally located and easily accessible to farmers.

Chief among the causes of the imperfect functioning of the distribution system in Toronto is the absence of adequate facilities for public markets and conditions and practices on its wholesale fruit market. Toronto has now the poorest public market of any city of any size in Ontario.

One of the findings of the commissioner is that growers have been underpaid in many cases, and that books and records have not been properly kept so as to show clearly each transaction put through.

We are ashamed of the standing of Toronto fruit and vegetable markets which stand at the bottom of the following list:

City	Sq. ft. area available for sale of fruit and vegetables by farmers or hucksters
Chatham	300,000
Ottawa	235,000
Kitchener	135,000
London	104,000
St. Thomas	46,000
Hamilton	74,000
St. Catharines	70,000
Brantford	40,000
Belleville	54,000
Peterboro	45,000
Kingston	32,000
Toronto	33,100

The influence of the different markets in the principal cities in Ontario in effecting distribution direct to the consumer appears from the following tables:

City	Population 1921 Census	Vendors on Public Market	Inhabitants per Vendor
Belleville	12,206	550	22
Kitchener	21,843	750	28
London	60,959	2,000	30
Chatham	13,256	300	44
St. Catharines	19,881	375	53
Brantford	29,440	500	58
Peterboro	20,994	300	69
Kingston	21,753	290	75
Ottawa	107,843	1,383	77
St. Thomas	16,026	150	106
Hamilton	114,151	732	156
Toronto	521,893	226	2,300

There is a tacit agreement among commission houses occupying space on the Toronto Fruit Market to charge twelve-and-a-half per cent. commission, plus certain sums for cartage. The cartage charge amounts to an extra commission of over one per cent. on commission sales. This charge is made whether the goods are delivered or not; but that the sums collected from the growers for cartage over the year approximately equal the actual cost of delivery of goods sold on commission in the year and the sums collected for commission and cartage give a gross percentage profit on commission sales which in some cases is double and in others is four times the gross percentage profit made by the same firms on merchandising transactions.

The commissioner recommended the establishment of a properly operated, grower-owned commission agency in Toronto which should result in improved service and a reduction of charges.

Other recommendations of the commissioner are:

1. That legislation be enacted making the jobber-broker combine unlawful.

Mr. Kitney's method of growing tomatoes on four wires ten inches apart.

2. That persons handling domestic fruits and vegetables on commission be required to make, and for a defined period to keep, proper and complete records of the disposition of goods entrusted to them for sale; and that it be made an offence to render false or misleading account sales or other similar returns.

3. That some proper official be given authority (*a*) to receive complaints from consignors of domestic fruits and vegetables; (*b*) to examine books and records of consignees; (*c*) to record fraudulent practices and bankruptcies of such persons; and (*d*) to take such action for the prosecution of offenders and the protection of the public as may be required.

4. That consideration be given to the creation of a Market Department with wide powers, for the purpose of co-ordinating co-operative and other shipping effort, disseminating reliable market information, and assisting the marketing of agricultural products on sound and economic lines both in Canada and abroad.

Something should be done, and done quickly, to relieve the already heavily taxed citizens of Toronto. Would it not be possible to arouse the City Council to the importance of better markets and to avoid the terrible destruction of food in hot weather. Would it not be possible to arrange for cold storage in connection with these perishable products? Here is an opportunity for some enterprising and ambitious young city Alderman to make a name for himself.

Some commission houses average the prices paid to the growers so as to keep their patrons in good cheer. This, in my opinion, is bad in principle and worse in practice. A grower should be paid over the actual amount received for his product after the usual commission of twelve-and-a-half per cent. has been deducted. These commission men receive your products in trust and they have no right, I take it, to transfer a portion of the price received for one man's goods and give it to another.

I am pleased that so many of our vegetable growers are becoming interested in the work that your officers and directors are endeavouring to do for you. This marketing problem is one of vital importance and there does not seem to have been much accomplished in recent years, but I am of opinion that a new era is dawning and that the men who till the soil will come into their own. It has been, indeed, a pleasure to work with the officers and members of our Association and I am confident that working together much will be accomplished for you and yours. Thank you for the confidence you have ever placed in me and I know that good results will follow through the efforts of this great convention.

Mr. George Rush, who was appointed as Vegetable Field Man by the Hon. John S. Martin, Miuister of Agriculture, some two years ago, continues to do good work for us. Several new branches have been organized, namely: Northumberland, Prince Edward, Bowmanville, Ancaster, Toronto Township and two or three more are joining up from Essex County. Our annual meeting held yesterday was the largest in the history of our Association, over fifty enthusiastic directors being in attendance. Any of the branches desiring the services of Mr. Rush should communicate with me as early as possible. We try to have Mr. Rush cover the branches in oue district at a time, thus saving much time and expense. Mr. Rush will present his report to the convention during the day.

REPORT OF THE VEGETABLE SPECIALIST

George Rush, Humber Bay

Organization.—Early in January, I visited Essex County and organized branches at Cottam and Belle River, and attended meetings of Tecumseh, Leamington and Chatham branches. In Wentworth County, I organized at Ancaster and West Hamilton and late in the year branches were started at Brighton in Northumberland County and at Bowmanville in Durham County. I visited every branch at least once during the year and in many cases spent several days in a district dealing with matters of a local nature. In almost every instance the meetings were well attended and much useful information was given to the members. Information was sought and obtained for branches which desired to purchase supplies. Many of the branches made arrangements to buy co-operatively which resulted in financial gain to the members. A better

understanding of prevailing conditions between the members was brought about in the different parts of the Province. The bringing together of growers in the different districts has taught them the lesson of co-operation which will result in better conditions in the growing and marketing of their products.

MARKETS.—During the year I have interviewed several City Councils and have obtained better facilities for the producers. Many by-laws were injurious to Canadian Growers selling direct to the consumers. With one exception (Toronto) I was received with courtesy and given help by the managers, and with the assistance of the market committees these by-laws were changed to the advantage of the grower and consumer. There is much work yet to be done along this line, as many towns and cities are sadly lacking in market spaces. Toronto is in great need of more market space and in Commissioner Duncan's report on his investigations into Toronto commission trade, he strongly recommends increased market facilities to bring producer and consumer together. We have entirely failed so far to induce the City Council to increase this space and have therefore taken the matter up with the York County Council, who as a body have been most sympathetic. Through their markets committee, we have succeeded in opening a market on Yonge Street, just outside of the city limits, which has proven a success, returned good interest on capital investment and given much financial help to growers and consumers, who can buy fresh fruit and vegetables direct.

The County Council at their meeting in November instructed the markets committee to purchase land in the east end and in the west end, similar to that in the north end, and $2,000 were granted to provide shelter at these markets.

Local growers are interested in establishing a co-operative market, controlled by themselves. Judging by experience gained by county markets this should prove a good investment and the increasing of these local markets would help to stabilize market conditions and improve the sales of home grown produce. They would also have a tendency to keep down excessive prices now charged for imported goods and would save thousands of dollars to the people of the Province.

The enforcing of the Dumping Act this fall was of great benefit to the trade as it quickened the demand for Canadian grown goods. There is an increasing demand for more effective measures to stop unfair dumping of vegetables on the Canadian markets.

There is much to be done by Canadian Growers in securing better and more uniform systems for shipping. If growers would co-operate in this, I am sure we could supply the needs of Northern Ontario markets with Southern Ontario produce, but there has, as yet, been no effort made towards establishing this trade. Some individual growers are shipping, but in minor quantities.

CANNING.—Much has been done to bring about a better understanding between the Canners and the Growers. Where Canners and Growers have met in conference, local conditions have been mutually improved. Prices have become more uniform throughout the Province and with better prices and better quality supplied to factories, a very valuable Canadian industry may be largely increased. Success of the canning industry can be materially advanced by close co-operation and good will between the canning companies and the vegetable growers.

FIELD WORK.—From experience gained through judging field crops, I can say that our growers are as well advanced in quantity and quality as our neighbours to the south, and in intelligent direction their work is second to none, and one is much impressed by the improved strains now used in Ontario. We

have most excellent soils for the production of every kind of fruit and vegetable that Canada requires (except tropical fruits), and if Canadian Growers will only see the great possibilities that lie before them, they will surely do all in their power to organize and educate themselves, so that they can meet, in an efficient way, the demands that will be made upon them.

The cold storage problem should be carefully studied for the better distribution of fruits and vegetables. The small cost of storage charged by the Provincial Cold Storage Company at Brighton should enable growers to increase production in the fall for winter distribution, which would mean much to them at a time of the year when outside work has ceased.

In New Ontario, I found great possibilities for seed potato production, but there are so many varieties grown in every district, that I believe that, if the rules as laid down by the Agricultural Societies Branch of the Department as to the standard varieties were adhered to, much benefit would result in so far as seed potatoes were concerned. I believe good would result from a meeting of district growers to discuss more uniformity of types, better selection of seed and advanced methods of planting. There is often a great loss of crop through these faulty methods.

In spite of climatic conditions, there was a splendid exhibition of fruit and vegetables at all the fall fairs at which I had the honour to judge, and I cannot close without expressing a sense of pride at the fact that our Canadian Growers secured the highest honours at the American Growers' Convention at Cleveland, Ohio, this year, and I trust that they may achieve even greater honours another year.

MR. ELLISON: So far as our past president's report was concerned, he referred to publicity. That is an important question. It is up to every individual as well as our Association to use every possible means in the way of propaganda to boost our Association in the work that they are undertaking. I lived for thirty-two years in this city. I was raised on a mixed farm and I am now farming at Beamsville, principally fruit, but I am specializing on early cabbage and staked tomatoes. I know a good deal about market conditions in the city. There is any amount of opportunity for work through our press at the present time. I look at the industry that produces fruit or vegetables—it is just like a human being—if you take cold, if that cold is not looked after it will settle in the weakest part of the constitution. Since the war labour and union organizations have protected themselves, with the result that the rebound has gone to the weakest of the community and that is the farmer. If that disease is not checked in a physical being and some prompt action taken, what would be the result. Death. Now it is up to us at the present time to be strong in regard to this Association and what it stands for.

Our secretary mentioned particularly the marketing system. I was here as a delegate for Beamsville making arrangements for the convention. Mr. Wilson mentioned the Duncan report. I read it and spent most of an afternoon with Mr. Duncan, and as you will all bear me out who heard him yesterday, I got some valuable information.

I am pleased to see that our Executive have already taken this report up. I would like to see it backed up by a commission—as it lacks a great deal in regard to packages, grading, etc., so as to be brought on the market to compete with British Columbia.

Mr. Rush also mentioned about getting more accurate and speedy market reports. He mentioned the radio. I get reports every day over it. If this radio service can give the stock reports, which I consider more or less gambling,

for that class of people, why can it not be used for our business? I would like to see that taken up along with the Duncan report.

I know Mr. Rush. We have an uphill fight. I belong to all the fruit associations and I am sorry to say that they have fallen down. We are where we were forty years ago. I would like to see a closer co-operation between fruit and vegetable growers, and a committee appointed to meet the fruit growers in Hamilton the 23rd, 24th and 25th of this month, to appear jointly with a committee of this Association before our Government here before the House adjourns.

THE GROWING OF TRANSPLANTED ONIONS

Geo. B. McCalla, St. Catharines

The onion is one of the most commonly grown vegetables, and I take it that each grower handles the crop in the manner which experience has shown to be best suited to his conditions. However, I have attended a good many of our annual conventions with a good deal of profit and pleasure to myself, so when our secretary asked me to address the meeting on "The Growing of Transplanted Onions," I felt it impossible to refuse.

If age lends dignity and distinction, the onion should be considered an aristocrat among vegetables, as its origin is lost in the mists of antiquity. It was highly esteemed and used in the ancient civilizations of Egypt and India, and at the present day very large quantities of Egyptian onions find their way to the American markets.

In this Province the chief commercial onion-growing areas are found in the reclaimed marsh lands of Essex County, where conditions seem very favourable, to the growth of this crop, and where no doubt many of you have seen them growing. However, onions can be, and are, grown in all the settled parts of Ontario, and on a variety of soils. The expression often heard, that a field works up like an onion bed, expresses the popular idea that the onion requires the best of conditions for its growth; and indeed the crop necessitates such an expenditure both of hand labour and soil preparation in its production, that to attempt to grow it except where all controllable conditions are favourable, is apt to end in disappointment and loss.

These conditions are briefly: the best seed obtainable, planted in a sandy loam, well drained either naturally or by tile. The soil should be well filled with humus, and with plenty of readily available plant food.

The seed should be obtained from a reliable dealer whose seed has given satisfaction in the past. We get our pickling onion seed from France at a much reduced cost as compared with prices quoted by Ontario dealers, and have had good results. I have never had good results with the larger onions produced from European seed. My experience has been that I got soft onions of very poor keeping quality.

The land should be well drained either naturally or artificially. This is particularly necessary in onion culture, because it is desirable to work the ground as early as possible in the spring, as well as to prevent injury at a later period in the crop's growth, should there be an excess of rainfall. An early start in the spring is essential in order that the plants may make as much growth as possible before the unfavourable weather conditions that often occur later in the

season, with the attendant insect and fungus enemies that often injure the crop. My garden land is tiled, with laterals every twenty feet, which gives satisfactory results.

A sandy loam, well filled with humus, is suitable for onions, as for many other garden crops. This is because such a soil is congenial to the onion plant and has a good water-holding capacity, as well as being easily worked with the hand tools which are necessarily used.

A high state of fertility is required to grow a profitable crop of onions. Stable manure is the basis of this fertility, but should not be applied too soon before the crop is sown or planted. My practice is to apply the manure after spinach or early potatoes the previous season, so that it has become rotted and incorporated in the soil before the onion crop is planted. Fresh manure applied just before planting, or even in the previous winter is, in my experience, not only of no benefit but a positive detriment. This may be supplemented by mixed commercial fertilizer applied broadcast just before planting, and with additional applications of nitrate of soda in the earlier stages of growth. The use of nitrate of soda at this time is desirable in forcing a quick growth early in the season before nitrification has begun in the soil. Nitrate is also beneficial if used in the hot dry weather of summer to stimulate growth and assist the plant in resisting the attack of the thrip, one of the worst enemies of the onion.

The use of the wheel hoe or cultivator at frequent intervals until the growth of the crop stops their use, with sufficient hand weeding to keep the plantation free of weeds is of course necessary.

The chief insect enemies of the onion are the maggot and the thrip. Various means of combating the maggot have been used but none have proved very satisfactory. A bordeaux and oil mixture is being used to some extent in New York State, but seems to be as yet in the experimental stage. The thrip is also difficult to eradicate. The use of nitrate of soda as before noted, and of overhead irrigation where possible, will help keep this pest in check.

The damping-off fungus in the seed bed, and blight in the field are the chief fungus enemies.

The foregoing remarks are general and apply to seed sown directly in the field as well as to a crop grown with transplanted plants. In using the latter method the seed is sown in March, usually in flats in the greenhouse, but may be sown in a hotbed.

The greatest enemy of the seedlings is the damping-off fungus, and this is more easily combated in a greenhouse, where ventilation and moisture are more under control than in a hotbed. I have always used a hotbed in growing the seedlings, sowing directly on the soil of the bed and covering the seed with clear lake sand.

Care must be taken to give all the air that weather conditions permit, and water sparingly. Last spring I used Senesan for the first time and with apparently beneficial results. However, one year's trial does not warrant any definite conclusions. When the seedlings are four or five inches high the tops should be clipped, and this repeated about once a week until planted in the field. This can usually be done with advantage early in May.

Our method of planting is to mark the ground, rows sixteen inches apart, and run out small furrows with the wheel hoe plough.

The plants are placed upright against the side of the furrow about four inches apart, the earth is then shoved back with the garden rake and firmed with the feet. We have always used the Prize Taker variety, though Giant

Gibraltar, Ailsa Craig or some others might give equally good results. Subsequent cultivation is the same as for seed sown crop.

With regard to the relative merits and cost of the two systems, I have a few ideas on the subject, but no definite facts or figures. The growing of plants for the transplanted crop and placing them in the ground are items of cost above that of the crop sown directly in the field. On the other hand the cost of pulling and topping is less, and they mature as a rule somewhat earlier, they avoid, to some extent, the injuries that often result from the attacks of thrip and blight. The large transplanted onions have a more limited sale than the seed crop, as most people prefer a smaller onion for boiling, and storekeepers and hucksters who sell by the small measure prefer a medium and smaller sized onion.

I had the pleasure of attending the New York State Vegetable Growers' Convention held at Buffalo last month. A report was made at that meeting of the results of a survey made by the State College officials of Cornell University to determine the cost of producing onions. The work seemed to have been done with great care and attention to details, and while their conditions and costs would no doubt be somewhat different from ours, the results were of interest.

The onions were all grown on muck lands. About fifty farms were visited, with an average of 7.35 acres of onions on each farm. The average yield per acre was 585 bushels. The growing cost about 39 cents per bushel, harvesting cost 26 cents per bushel, marketing cost 11 cents per bushel, a total of about 76 cents per bushel.

QUESTION: What time do you sow the seeds in the hot beds?

G. B. MCCALLA: The men who have greenhouses sow them pretty early, but I have found it is not necessary to sow before the middle of March. I don't think for the transplanted crop that there is much advantage in planting in the field early, if the onion has to sit there for a week or two in the cold weather.

QUESTION: What kind of seed?

G. B. MCCALLA: I use Prize Taker. Giant, Gibraltar and Alisa Craig are also used but I have had good results with Prize Taker and I have stuck to that variety.

QUESTION: How much nitrate of soda do you use?

G. B. MCCALLA: I use 400 pounds to the acre during the growth of the crop. That would be applied four or five times.

QUESTION: What distance do you plant them apart?

G. B. MCCALLA: About four inches apart.

QUESTION: In using nitrate of soda, would it be possible to dissolve and apply with a spray?

G. B. MCCALLA: It would be a good idea to apply with a spray. In using an early irrigation on cabbage, I know of one man who applies his nitrate of soda by a pump.

QUESTION: What method do you adopt with maggot?

G. B. MCCALLA: I have had no trouble with maggot, the only thing used was sodium arsenate dissolved in water and used with a little molasses as a bait.

QUESTION: Could you tell us where to procure the Prize Taker seed?

G. B. MCCALLA: I get my seed from the Jos. Harris Company at Coldwater, N.Y.

QUESTION: Have you much trouble with thick neck in Prize Taker variety?

G. B. MCCALLA: No.

Question: *Do you find any weakness in the soil the following year after using nitrate?*

G. B. McCalla: No. If nitrate was used without a large amount of other plant food in the soil, it is possible that nitrate might stimulate growth and rob the soil more than it would if there was a weak growth.

SOME INSECTS ATTACKING VEGETABLES

L. Caesar, Provincial Entomologist

The insects I purpose discussing are slugs, European corn borers, onion thrips, onion maggot, carrot rust fly and striped cucumber beetle.

Slugs

Slugs are slow-moving, slimy, soft, grey creatures about one to one-and-one-half inches long when full grown. Moisture is a necessity for them and it is only in a wet spring or fall that they are of much importance. They have sharp biting or rasping mouthparts and can eat holes in leaves or sta t at the outside and gradually devour the whole leaf. Beans and corn are usually the worst injured plants, especially in the spring.

Control.—The easiest method of control probably is to spray the affected plants at once with Bordeaux mixture. This repels the slugs and thus saves the plants. Dusting the surface of the soil around the plants that are being attacked will also kill them, because, if the slugs have to move through the lime to their food or if the lime is scattered directly upon them when they are feeding, they destroy themselves in their efforts to get rid of it.

Another remedy sometimes used is to chop up lettuce or clover and dust them with arsenate of lime at the rate of one pound of the poison to sixteen pounds of leaves. This is scattered around where the slugs are in the evening.

European Corn Borers

That this borer is a great menace to the sweet corn industry is indisputable. Without better clean-up methods being practised it will destroy after a few years the sweet corn industry in every part of the Province, but not, of course nearly so quickly as it has done this in Essex and Kent; for in these districts the method of handling both field and sweet corn has been most favourable to the increase of the borers simply because they grow there corn of all kinds for the ears or grain and do not feed the stalks but as a rule merely break them down, disc the ground and put in a grain crop without any ploughing. This condition of affairs is just what suits the corn borer. In other counties, except the southern part of Lambton, our usual practice is to feed nearly all the cornstalks, many of them being ensiled. Any stalks that are put into the silo or that are eaten by the cattle have the borers in them destroyed. In addition our practice is to plough the field in at least 75 per cent. of the cases either in the fall of the year or the next spring. Ploughing is a great factor in control. It does not kill the borers directly but the way it acts is that when they are buried they are put into unnatural conditions and so they gradually work their way to the surface and, if there are no cornstalks or stubbles to enter, they perish from exposure

to the weather or from the attacks of birds, ants, beetles or other insects. So that in order to destroy the corn borer we must destroy as nearly as we can all borers in the corn plants including the stubble and also the weeds in among the corn, though weeds elsewhere are of no importance. This destruction may be done any time in the fall or in the spring up to the first of June. I have already indicated the methods of doing it, namely, to cut the corn low, either to ensile it or feed it whole or shred it or burn it if not needed for food, burning also any remnants of the stalks that the cattle do not eat when fed whole. Then all the field must be ploughed under thoroughly to bury all stubble and refuse. This must not be dragged up again when cultivating, therefore a disc instead of a toothed implement should be used so far as possible in cultivating the ploughed corn field.

The Corn Borer Act at present is in operation only in eight counties but it is my intention to extend it this year as far as I am justified in doing so. Hence it likely will be enforced in almost all the main sweet corn growing districts this fall. In the meantime I urge every man who is interested in this work to clean up his own corn plot and to urge his neighbours to do likewise.

Onion Thrips

All onion growers know that thrips are very tiny insects, only about one-twenty-fifth of an inch long. The adults are usually light brown and the young or nymphs are white or cream. Both young and adults rasp the tissues of onions, suck out the juice and cause a small white blotch wherever they work. The result is that a badly infested field has a blanched appearance, the leaves wilt and fall over and the crop is often greatly reduced.

Thrips are always worst in dry weather, partly because heavy rains wash off great numbers and kill them and partly because wet weather itself, is unfavourable to them.

Control.—If these insects are present in May or early June a great deal can be done to prevent a serious outbreak by spraying them at once with half a pint of nicotine sulphate 40 per cent. and three or four pounds of soap to 40 gallons of water. The spray must be applied with force so that it will be driven down into the axils of the leaves where the thrips are very numerous and hard to reach. It must be repeated in a week or ten days, because the pupal stage of thrips is passed in the ground and the eggs are deeply inserted into the leaves. Thus neither pupae or eggs are killed by the spray and therefore the need of a second application.

The best general method of avoiding injury from thrips is by destroying them in the fall and spring by clean-up methods. In doing this the first step is to know that the thrips winter over as adults under piles of onion tops or culls or screenings in the onion field itself and also among onions left growing in the field. They are, moreover, found in any dense grassy or weedy place nearby and in alfalfa fields. In greenhouses they continue breeding all winter.

The second step is to destroy them in all these places. To accomplish this all onion remnants should be ploughed down or burned in fall. In spring all headlands, grass and weeds should be burned over on every side of the onion field to as great a distance as possible and greenhouses should be fumigated with tobacco or hydrocyanic acid gas several times at intervals of a week until the thrips are thoroughly controlled. It is also a help not to grow green onions for sale in early spring near where the main onion field is to be and in the spring it

is wise if it can be managed not to grow cabbage or cauliflower near onions as these plants are also quite subject to attack.

Onion sets, too, often cause trouble as they come on ahead of the ordinary seedlings and attract thrips to them much earlier, and then the thrips gradually pass from these to the main onions. If one is going to grow sets in the field with other onions it is wise to spray them as soon as the thrips are seen to be attacking. This will help to keep them from being a menace to the rest of the onions.

Any treatment of soil that makes for more rapid and better growth will of course help plants to withstand injury better.

Onion Maggot

The onion maggot is usually our most destructive onion pest though some years the onion does more damage. By the maggot is meant the small, white worm about a quarter of an inch long which works in the roots and stems of young onions in June and kills them and also attacks later in the season, even up to the time of picking, the onion bulbs, causing them to rot or be unfit for sale.

Control.—For years various substances have been tried as control measures but the most successful is one lately discovered by the entomologists of Illinois; namely, spraying the onions with a lubricating oil emulsion. We have tried this out on a moderate scale the last two years and in both it has given decidedly favourable results.

The emulsion is made of a cheap lubricating oil costing about 35 cents per gallon in barrel lots. The oil can be obtained from our main oil companies. It must have the following properties:

1. A specific gravity of .87 to .93 at 20 degrees C.
2. A viscosity of 90 to 250 seconds (Saybolt test) at 100 degrees F.
3. A volatility not above 2% at 110 degrees C. for four hours.

There are several formulae which may be used to make the emulsion. Perhaps the best is one in which potash fish oil soap is employed but this involves boiling and the taking of certain other precautions which most growers do not wish to take time for. Hence I am suggesting another simple one which we have used:

Lubricating oil	1 gal.
Bluestone (copper sulphate)	1 ounce.
Hydrated lime	1 ounce.
Water	1 gallon.

Dissolve the bluestone and make up to half a gallon with water. Mix the hydrated lime in another half a gallon, then pour the water upon the bluestone and stir at once. This makes a gallon of weak Bordeaux. (Bordeaux used for this purpose must always be fresh.) Pour this into the oil, stir and then pump it at least three times through the spray tank so that it will be thoroughly emulsified.

This makes an emulsion containing two-and-a-half per cent. of oil which is about the right strength. Spray this directly down upon the plants, holding the nozzle near them so that the stem and the ground immediately around it will be thoroughly wet. This destroys the eggs and young maggots. Four applications should be made. The best time for the first has not been so definitely determined as we should like but should probably be about the time the apple bloom is just coming out, as that will be about the time the eggs are being laid. The remaining applications should be applied at intervals of a week.

Carrot Rust Fly

This is a small white or yellowish-white maggot which did a great deal of damage to carrots last year, and every year causes damage in some localities, especially where the carrot plot is well shaded as in gardens in towns or where there are many shade trees. Fields that are out in the open and exposed are seldom much troubled. The maggots cause injury first in the early part of the season and then again in September and October but not during the middle of the summer. The main damage is done in the fall. Badly infested fields will sometimes then have almost every carrot ruined by the maggots working here and there through the main root, especially down towards the tip which is often so badly affected as to rot.

Control.—Unfortunately I cannot at present give you any good control recommendations though I hope to be able to do so in a couple of years. However, I might make three suggestions to think over.

1. As I said above the insect is worst in sheltered places. Hence it would seem wise to plant carrots, if possible, only in open, wind-swept situations.
2. By not planting until about June 1st early injury may be largely avoided.
3. If the carrots are planted early and are all dug by September 1st and then stored, late injury can largely be avoided.

There are a few substances such as derris and sodium fluosilicate which are promising as remedies but not tested sufficiently yet.

Striped Cucumber Beetle

You are all familiar with the small yellow and black beetle which attacks cucumbers, squash, melons and other closely allied plants soon after they come through the ground, eats off the leaves and kills the plants.

Control.—We have spent a great deal of time on this insect and have found three things that will control it. I shall give you only the cheapest; namely, arsenate of lime, one part by weight to 20 parts of gypsum. Mix these well and dust with a hand duster both surfaces of leaves as soon as there are enough beetles to justify doing so. Then repeat after rains or whenever beetles are again attacking. Usually three applications are sufficient. Cover leaves well each time.

Hydrated lime is sometimes used for dusting with or without the arsenate of lime, but some years stunts the plants too much to justify using it.

ADDRESS

Mr. T. J. Mahoney, M.P.P.

As has been intimated by your secretary, it is your intention to bring two matters before the Government to get legislation. Those of us who have been endeavouring to get a living out of vegetable growing realize this factor, that regardless of how perfect our cultural methods may be, the one thing which is necessary to make your industry successful is that you should make money by it and the important thing in this is the marketing end of your business.

Efforts have been made to secure from the Government at Ottawa a seasonal tariff—a tariff for our fruit and vegetables at those seasons of the year in which

we have an ample supply to fill the requirements of this country, and I understand the second hearing on this Bill will take place on the 22nd of March, and I would impress upon members that regardless of who your member may be, this with you is a business matter and you should take it up with him, and if he is representing you, he should endeavour to bring such influence to bear on this Tariff Advisory Board which is sitting at Ottawa to see that this measure goes through, because I believe it is of vital importance that it should go through, in order that the Fruit and Vegetable Growers may carry on their business in a profitable way.

Possibly it is not necessary to give advice to some of you here who may be skilled in the ways of politicians, but my excuse for doing so is the fact that I have been a member of the Legislature for four or five years and know something of methods used by organizations to impress their views on the Government, and I do know in connection with this matter which is now being discussed at Ottawa that the farmers of the three Prairie Provinces have had their representative, Mr. Millar, there for the last six weeks with an office in the building endeavouring to combat the application which is being made on behalf of the Fruit and Vegetable Growers of Ontario and the Province of Quebec. It is, as I say, for this reason a vital necessity for every person here who is living in a district interested in the growing of fruit and vegetables to see that this matter is properly presented to their local member.

Now as regards the resolution which is being presented at this meeting, having for its purpose securing from the Federal Government legislation which is for the good of your industry: I can only say that according to my observations we are very near to the time when it is the duty of the government to pass such legislation as will make it necessary for any person dealing with fruits and vegetables to have a license in order that the Government may be able to check these people up and in order that such conditions as have been exposed in the Duncan report, may cease to exist.

You will realize that legislation is no good unless it is practicable and workable, and whatever you ask for will have to be thoroughly scrutinized in order to see that it will be workable from that standpoint. I can only say that those of the Legislature who are interested will be only too glad to forward what you have to the Government.

CELERY GROWING

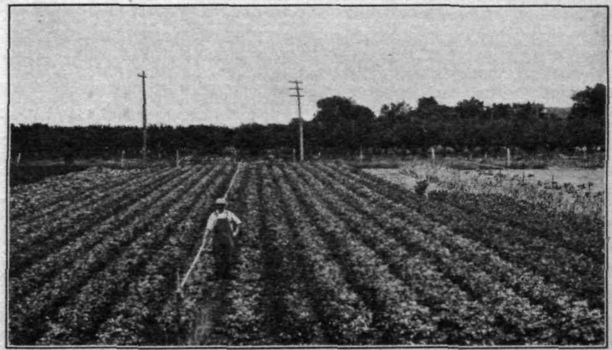
James Little, St. Catharines

Starting with the soil preparation for the seed in the fall of the year. I mix sod and well rotted manure and ordinary earth of an equal amount, about equal parts each. I prefer having it frozen solid before using it in the spring. I put it in on a bench and let it thaw out. Last year, the first celery seed I sowed was about the 9th of March. Then I followed with another sowing, four sowings, ten days apart. When the celery was ready for transplanting I put it into flats. I generally try to put about 66 in each flat, not more than that, that gives the plants more space for growing—about 11 rows of 6 each. I let them grow there for two or three weeks and then I put them in the bed. When manure is scarce I don't put much manure under them, just enough for drainage. I let them grow there until about the last week in May. Then you can transplant to the field. When preparing the land in the field, give it a good heavy coat in the

fall. The plowing is one horse work. Then plow it again in the spring and work it up a little to hold moisture and keep it in good shape.

When I am through working it, I put on a fertilizer. I use tankage for that. Give it a good heavy coat of fertilizer, then turn it under.

About the last week in May I planted the first sowing in the flats. I grow it all in flats. The first year I tried any in transplanting there was 18 inches between the row and 8 inches in the row. I just tried half a dozen rows that way and it turned out pretty good. I think I could grow it a little closer than that and have just as good celery and you could get more out of the same space of land. It is less labour when you come to bed it. I will try quite a bit more that way this year, as it did all right with me last year. Then the balance—I put 30 inches in between the rows and the same distance between the row for cultivating with the horse, and keep working it pretty regularly. I work it once or twice a week, as often as I get a chance at it. The last planting was about the end of June. What I call the Cleveland was planted about the 9th.



A healthy celery field.

The first lot that I planted out in the bed was ready for hilling up about the first or second week of August. I hilled it up with earth like an old potato hill and let it go like that for a week, then put the boards on for bleaching. It was ready in about ten days after that. The Golden Plume is very easily bleached. It will bleach in not many days if it is warm weather.

Then I also give it some nitrate of soda, about three applications—about 500 lbs. to the acre—the first dressing was a light one, the last one a little heavier. I don't give the first until about two or three weeks after it is set out. I turn on irrigation, sow the nitrate right up alongside the rows and very often I take the little wheel hoe—I like to get it turned under the surface, so that no big rain comes and washes it away. I generally run the little cultivator up alongside the row where I have sown it, then turn on the water and it gets it dissolved at once.

Then I spray the beds: the first is done before I set the plants out, I cover it all thoroughly with Bordeaux 4.4.40. Then the next spraying will be just

as soon as I think it needs it, which is according to the growth. I keep the green foliage covered with spray, and there will be not much trouble with blight—say every ten days. When it is well started, it gets a good growth in that time. I never have any trouble with blight.

Getting it ready for market: I spread the celery on boards, tops together and butts out, and you can go along with your hose into the hearts of it, and you have not much trouble in washing it that way.

In the marketing, there is very little of it I draw away from home. Most of it is sold at the door. For some I get $1.50 a dozen, but it runs about $1.25. There may be odd dozens that I have to sell for $1. That is one fault I have to find with the Golden Plume. It is not as even a crop as the Paris Golden.

Another thing it has not the keeping qualities that the Golden has. It is a good quality for early celery but as soon as it is matured it is time to get rid of it. Otherwise you will be selling hearts.

I suppose some of you will be interested to know where I get my seed. What I principally grow is the new strain of Paris Golden. I always grew it until last year when I got a little of this Golden Plume from Forbes & Sons of Newark, N.J. I got it at the right stage. It is nice stuff when you get it at the right stage. The other I have been getting from Douglas & Roy, Brampton.

Golden Plume is all right for those who want to get it all away at once, but for those who are attending the market and have to sell so much every week, it will not stand for any length of time.

My fertilizer analyses 6.15. I apply half a ton to the acre and make three applications.

CECIL DELWORTH: It is said that it is an ill wind that blows no one good, and the subject that I was scheduled to address you on "Why Vegetable Growing Industry should be Protected," is one to which I have given a good deal of attention during the last few years. As I study this subject it gets larger and larger. The reasons why the vegetable growing industry should be protected are so many that it takes a long time for a man to cover it.

CELERY BLIGHT CONTROL

DR. H. W. DYE, Middleport, N.Y.

Growers speak of all leaf-spot troubles of celery as "blight" or "rust," but, as a matter of fact, there are actually three different and distinct diseases which cause the familiar leaf-spotting of celery. As a matter of interest and information some differences between these is given. Late blight is the most destructive of these under your conditions and is evident on the leaves as angular black spots in which the tiny black fruiting-bodies of the fungus are very evident. These numerous small black blight spots make it easy to identify late-blight, or Septoria-blight as it is often called. Bacterial blight spots, which at first glance appear somewhat like those of late blight, are small and round as compared to the more angular ones of late blight. They are usually more brownish and are perfectly smooth with no fruiting bodies showing on the surface. In the case of early blight, or cercospora blight, the spots are much larger than those of the other two blights described, and, under favourable conditions of moisture for blight development, are covered with an ashen-gray velvety fungus growth. This latter disease is more general in warmer climates but probably occasionally

All of these "blights," however, live over from year to year in about the same way and so far as actual control measures go one plan of procedure will effectively control all of them.

Celery blight lives over for the most part in diseased celery trash remaining in the field after the crop is harvested. Late blight occasionally is borne on the seed also, but, as will be explained later, this is not usually an important method of introducing it into your celery crop. An individual grower, whose own plants and soil are free from blight, may introduce it on seedling plants purchased from a neighbour who employs less care in the production of disease-free seedlings.

Early infections may appear in the seed-bed or after the plants are set in the field, and will show first on the lower leaves which come in contact with the ground and with the fungus-infested over-wintering celery trash. In this connection, the question often arises as to how long a rotation would be necessary to eliminate celery blight from an infested field but, while this is known for certain other diseases, there is no data available on this point and so far as we know no practicable rotation would be long enough to eliminate blight from a field in this manner.

From these early infections blight spots will develop and the blight organism soon develops sufficiently to bring about the spread of the disease. Most of the spread of the fungus from these early blight spots is through the washing about or splashing of the spores, or bacteria in the case of the bacterial-blight, during rain storms. The exact conditions necessary to make infection possible are not known but probably a saturated atmosphere for from six to eight hours would accurately describe these conditions. Thus a late evening shower with the plants remaining moist all night long would furnish the very best of conditions to bring about such infections, and possibly heavy dews would accomplish the same thing. The very best conditions are furnished by several heavy showers, keeping the plants moist for some time, since tremendous quantities of spores are liberated under such conditions. It takes approximately twelve to fourteen days for these spots to become visible after infection has occurred and about a week more for spore formation to occur in the case of late blight, and probably about the same for early blight. With conditions at that time which will produce a saturated atmosphere for six or eight hours an abundant spread of the blight organism will follow.

The final symptoms of blight on celery may vary from merely scattered blight spots on the outer leaves to a heavy blight infection with similar spots appearing on the leaf stalks and leaf blades. With severe infection the entire plant and crop of celery may have a "rusty" appearance and the plants will not develop to their normal size.

Celery blights directly reduce the yield by making it necessary to trim off more of the outer leaves than would normally be the case and this results in an actual reduction of yield, the amount of reduction depending upon the severity of the blight. Direct injury to the crop may thus range from slight injury to complete destruction. All of you growers have probably grown celery, or at least have seen a neighbour's field, where blight was so destructive, that the crop was destroyed and was plowed under. Indirectly, the quality of the crop is injured by making it necessary to trim more heavily than would be the case with blight-free celery. This results in a lowered price. Only a small amount of blight development in a field reduces directly or indirectly the quality of a crop much more than the actual cost of blight prevention.

No simple method of seed or soil treatment will prevent blight damage. Seed may be infested with late blight but the fungus is unable to persist on the

seed for longer than two years. Seed growers generally recognize this and the majority of the seed which you will secure is free from blight. Although recommendations for seed treatment are occasionally made, I personally do not make them because seedbed and field control measures are always necessary, whether the seed is treated or not, and these later control measures will of themselves produce a disease-free crop. Although it is a popular belief among some growers that they can prevent blight damage by the use of certain fertilizers this is not borne out in the field.

The only effective control measure for celery blights is the application of a copper fungicide in the seed-bed and in the field, to keep the new growth protected as it develops. The generally known 5-5-40 Bordeaux mixture may be used with perfect satisfaction for this purpose and, where desired, this material may be substituted for dust in the following recommendations. However, since the development of Copper-Lime Dust for the control of this disease, growers generally have adopted the dusting method and to-day, in the majority of the celery growing sections, this is the popular method of celery blight control.

Comparative dusting and spraying experiments for the control of celery blights were conducted by the New York State College of Agriculture between the years 1917 and 1923. The results of this work are reported in Bulletin 429 of the New York State College of Agriculture, at Ithaca, New York. In the latter part of these experiments Mr. A. G. Newhall, now connected with the Ohio Agricultural Experiment Station, was associated with me. Since the above experiments were conducted, Mr. Newhall has also secured similar results in Ohio. Consequently, the recommendation of celery dusting is based upon extensive experiment station data and is wholly worthy of your consideration.

At the termination of the experiments in New York, growers there generally took up the practice of dusting. To-day celery dusting is the general practice among New York State growers and has been widely adopted in the State of Michigan. An article published in 1926 by Mr. Newhall on celery dusting, states that probably more than two hundred and fifty Ohio celery growers are dusting and that more than fifteen hundred acres of celery are being dusted in that state. The same situation exists here in Ontario, dusting being widely practiced by your leading growers with excellent results.

The dust which has given the best results and is most generally used is the standard 20-80 Copper-Lime Dust, which contains 20% Monohydrated Copper Sulphate. When applied to plants wet with dew this forms on the plants the same Bordeaux film as is made in the spray tank by the liquid Bordeaux with which you are familiar.

Blight infection may appear in the seed-bed and Mr. Newhall has proven both in New York State and in Ohio, that from two to four applications of dust in the seed-bed are very beneficial in preventing later blight development in the field. This is especially true where the seed-beds are upon soil in which celery has been grown previously, and especially marked results will be obtained under those conditions, but seed-bed dusting is good insurance under any conditions and should never be omitted. The first application should be made when the first true leaves are formed, which will be when the plants are about one inch high, and later light applications should be made to protect the plants as they develop. The quantity of dust needed for these applications is small, usually averaging about one pound per square rod of seed-bed.

The purpose of dusting in the field is to protect the new growth as it develops. Consequently, the number of applications necessary depends upon the rate of growth of the celery and protection should be especially thorough during rainy

periods, for these constitute the ideal conditions for blight development. Ordinarily, weekly applications will insure a clean crop of celery and these should be begun as soon as the plants are thoroughly established in the field and continued up until just before banking time. Under average conditions, from five to seven applications in the field will produce a blight-free crop of celery. The quantity of dust to be applied will range from fifteen pounds, when the plants are small, to thirty-five pounds at maturity. Another way of making this recommendation is that a one hundred pound drum of material should cover approximately five acres when the plants are small, and at the latter part of the season the same amount of dust should be applied to three acres. If, for any reason, blight gets a start in your field then two, or possibly three, applications at intervals of three days should be made. This will check the spread of the disease and if followed by weekly applications will assure under practically all conditions a clean crop of celery.

The value of celery blight prevention may range from merely enabling you to produce a larger and better quality crop to making all the difference between a profitable crop and no crop under severe blight conditions. Even in years of moderate development it has been found that increases of yield which ranged from 20% to 40%, or more, in many instances, may be secured by blight prevention. The cost of such protection is slight, ranging from $20.00 to at the most $30.00 per acre under practically all conditions, which is certainly cheap insurance for growers like yourselves who are producing an expensive and valuable crop on high-priced land. In growing celery the initial investment, fertilizer used, cultivation, and harvesting are all expensive major operations in the production of the crop. The cost of blight prevention is less than any of these and yet the entire investment may be lost if this is not attempted or is a failure.

My experience with celery blight control makes me feel no hesitancy in stating that celery blights can be effectively, simply, easily and cheaply controlled. No celery grower can profitably attempt to grow this crop without the insurance which thorough protection with a copper fungicide will give him.

W. J. COOKE: The winter spore remained in the trash. In soil that had no trash did the spores winter just the same?

DR. DYE: Yes.

W. J. COOKE: These resting spores, under what conditions do they first germinate?

DR. DYE: The temperature on which the celery fungus is most active is between 60 and 70 degrees. Any normal night after a shower will do.

W. J. COOKE: If we have a light attack and then dust thoroughly, would there be any recurring attack?

DR. DYE: Plenty of them, but they won't do you any damage if you keep your foliage protected. Later applications are merely to protect new foliage. I like to shoot the fungicide in from both sides, you are giving the lower part of your plant two applications in that way.

W. J. COOKE: Will that first dusting remain throughout the season?

DR. DYE: In general it will. It will remain practically indefinitely to afford protection.

QUESTION: What do you ask for when you buy your dust?

DR. DYE: An ordinary 20% copper dust is what you ask for. Green dust is another name for it, but it is made by another process.

QUESTION: Where do you get it?

DR. DYE: There are various sources. The Niagara Brand Spray Co. handle it.

QUESTION: A number of our growers have the impression that the dus should not be applied when the plants are wet.

DR. DYE: In dusting with sulphur it can be put on at any time. If it i put on as copper dust it is well to do it when the plants are wet.

MR. FRETZ: The Niagara people are preparing a Blight Special. Do you know what it is?

DR. DYE: *I don't know; 20% is the average.*

QUESTION: Has a heavy application of lime to the soil any effect in keepin blight away?

DR. DYE: I have never seen that any application of lime or sulphur o other chemical of the soil has any effect.

QUESTION: Is there a dust prepared for other crops?

Dr. DYE: It is a general purpose dust.

QUESTION: Does the pressure at which you put this dust on make an difference?

DR. DYE: With any material that you put on, you want as much pressur as you can get. If it is sprayer, get as much pressure as you can get. If it is Nap sprayer keep it pumped up all you can. There was no definite knowledg of how long a celery organism could live in the soil. Some, he said, live in th ground for seventeen years.

MR. COOKE: Can host plants live on any other garden crops?

DR. DYE: No.

QUESTION: When the resting spore breaks, what power has the bacill to rise?

DR. DYE: *None. It just oozes out on the surface with a shower for moisture fo* two or three hours. These spores will be out on the surface, then rain will splas them down on leaves below. If you walk through, you will carry them on you trousers' legs.

QUESTION: Is it not possible to control, or partially control, Celery Hear Rot by the application of Black Leaf .40?

DR. DYE: I don't know, and one of the reasons is that Heart Rot ma *mean one thing here and another in Florida.*

The questioner said he referred to the Tarnished Plant Bug, and the speake said that could be controlled.

DISEASE CONTROL IN GREENHOUSES

(With Special References to Certain Diseases)

DR. B. T. DICKSON, Professor of Plant Pathology, Macdonald College, McGil University

I am delighted to come from Quebec to address a gathering of Ontari Vegetable Growers at *once so strong numerically* and so evidently keen t know the scientific facts which relate to actual practice in the growing of greenhouses and truck crops.

There are, of course, certain general principles which must be borne in mind in any attempt to control disease, especially in the greenhouse or frame. In human medicine hygiene, both of the home and the person, is vital to health. Proper ventilation, attention to light, cleanliness in the house or factory, persona *cleanliness of skin, teeth, etc., and care in diet must be maintained to* give the environment necessary for the perpetuation of a healthy body.

So also with plants grown in large numbers in a greenhouse. Overfeeding with nitrogenous fertilizers or overwatering accompanied by poor ventilation will give too succulent a plant and such a plant is already predisposed to take a disease and to suffer severely from it.

The soil should be clean, well-drained and so cultivated and mulched that it will be able to maintain the necessary water supply if the weather happens to turn bright and drying and yet not create a saturated condition in dull cloudy weather. By clean soil is meant soil which is free from disease-producing organisms. These may be present in the root parts left in the soil, in leaf fragments or other plant debris. They may also be present as spores which act like seed for the fungus or as hard black bodies varying in size from a pinhead to nearly half an inch in length, which function like tubers for the fungus. If the soil contains such, it will be evidenced by the recurrence of the disease when all other precautions such as clean seed, disinfected seed, dusting or spraying, etc., have been taken. It may be that to change the soil is out of the question, but it can always be well trenched or dug and nowadays disinfection with steam or formalin is quite usual (see p. 45 V.G.A. 21st Ann. Rept.) Poorly drained soils are worse than those lacking fertility, and neglect of drainage is fatal.

The necessity of maintaining the right temperature is well known to al greenhouse men and the damping-off due to unsuitable temperature and too great humidity has occasioned loss to almost everyone.

Benches and walls must not be neglected for it frequently happens that these are the very places where the spores of fungi remain secure until a suitable crop is available.

Finally the plant itself comes from seed and, if the seed is not good or not clean, one cannot expect a satisfactory crop.

Lettuce drop in a flat, produced experimentally.

Lettuce Drop: This disease is common in the Southern States on the outdoor crop and is quite destructive in Bermuda. With us it is a greenhouse trouble and from 10 to 20% of the crop may be destroyed. The fungus which causes this disease attacks other vegetables such as carrots, beans, tomatoes, parsnips, etc. In the case of lettuce, the rot begins on the stem near the surface of the soil and it works into the leaf bases. When the fungus has killed the tissues of the leaf base, the leaf drops and hence the name of the disease. Gradually the fungus grows up into the heart slowly reducing the tender foliage to a wet slimy mass. If the humidity is maintained fairly high the fungus

develops a white cobwebby growth in which black sclerotial bodies develop later. These fall to the soil and remain there until such time as another crop is available for their attack.

If but one or two plants are affected they should be carefully taken out along with the soil immediately around them so that the disease does not spread. If the soil is rather badly infected it will be necessary to disinfect it either by the use of steam or formaldehyde.

CUCUMBER WILT: Cucumber wilt is caused by bacteria and the same disease occurs in musk-melon, pumpkin, and squash. The first evidence of the disease is the drooping of one or a few leaves. The bacteria spread from the leaf to the stalk and thence into the stem so that eventually the whole plant may wilt and die. If a plant is wilting the fact that it is suffering from cucumber wilt may be demonstrated by testing the sap. This is done by cutting or breaking a leaf stalk near the vine, touching the cut surface with the finger and slowly withdrawing the finger. If the sap strings out from the cut surface to the finger it is evidence of the fact that wilt is present. The disease is transmitted by the striped and 12-spotted cucumber beetle and it is also preserved over winter in the intestinal tract of hibernating beetles. When infected beetles chew at a young cucumber plant some of the feces are likely to drop on the wounded parts and thus the infection is established. If the humidity is fairly high wilt will then show in from seven to fifteen days. In order to control this disease it is necessary to keep away cucumber beetles. A few plants may be protected by cheesecloth but where they are grown in numbers it is essential to dust with calcium arsenate 1 lb. mixed with 20 lbs. of ground gypsum. Hydrated lime is not suitable in the place of gypsum because it is generally injurious to cucumber seedlings. The dust should be given approximately every day until the plants begin to vine, and after that about once a week.

CUCUMBER MOSAIC: For the last ten years or so a group of diseases generally known as virus diseases has been puzzling scientists, who are endeavouring to ascertain the causes in order to arrive at sound conclusions in control. One of this group is cucumber mosaic. It causes a peculiar wartiness of the fruits and it kills the vines in greenhouses reducing the number of fruit, spoiling their flavour, and making them useless commercially. The plants may be infected at any stage in their growth from seedling to mature plant. The leaves are mottled yellowish green and dark green and they may be wrinkled and curled. As the plant grows older the mottling may not be so pronounced. The disease is disseminated by insects and by the handling of the vines during cultivation and harvesting. Many wild plants are also infected with this disease such as milkweed and physalis, wild cucumber, poke weed and catnip. Some of these are perennials and in them the disease is carried over in the root stocks. In the case of wild cucumber it can live over winter in the seed. In the light of our present knowledge the following recommendations for control are given: the crop should be rotated with crops not related to cucumber or to any of the weed hosts of the disease; cucumbers should not be grown too near farm buildings and the vegetable garden because it is in just those places that ground cherry, milkweed, etc., are commonly found. Weed hosts should be removed from the cucumber field or the greenhouse when they are observed. As soon as a cucumber plant is seen to have mosaic it should be removed at once and destroyed. In the greenhouse diseased plants should be pulled up by the roots but left on the trellis or supports until quite dry so that it can be removed with least chance of injury to a surrounding vine. Dusting as to cucumber wilt is of course necessary.

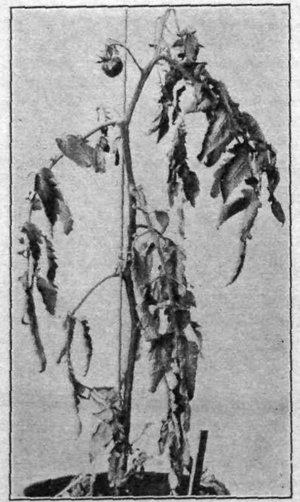
BLOSSOM-END ROT OF TOMATO: This, as the name indicates, is an affection of the tomato fruit at the end farthest removed from the plant. The first indication of trouble is the presence of a slight water-soaked area which gradually enlarges and darkens, finally drying out and turning black. It always occurs at the blossom-end and can therefore be distinguished from the black lesions caused by the nail-head organism. An upsetting of the water relationship is the cause of the trouble. If a plant is very succulent and has been grown under conditions of rather high humidity, perhaps due to cloudy weather with over-watering and for some reason the water supply is cut down the blossom end of the fruit is the first part of the plant to suffer from the lack of water. Being very sensitive to sudden change in water supply this part of the fruit begins to break down. The change in water supply may be due to an actual reduction in the amount of water given or it may be due to the on-coming of bright drying weather after a dull cloudy period. Such bright weather immediately sets up a much more rapid water loss from the plant and if the root system has already been working at full pressure it cannot under the bright conditions supply the necessary amount of water to fill the needs at the blossom end of the fruit. In control, therefore, it is necessary to regulate the water supply according to conditions existing at the time and to avoid too succulent a growth on the part of the plant. It is found that nitrogenous fertilizers tend to increase the trouble while lime and well aerated soil at a rather cool uniform temperature check it.

TOMATO STREAK.—This disease is another of the mysterious ones above mentioned. It was first described about 1890, in New York State and is now known to occur in New York, Pennsylvania, Indiana, Ontario, Quebec, England, Channel Islands, New Zealand and Australia. It is therefore widespread, especially in greenhouses.

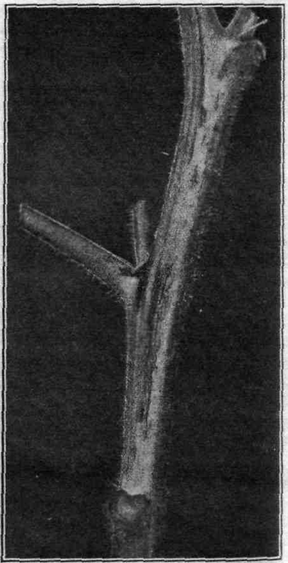
Various views have been held as to the cause of this disease. By some it was thought to be due to unbalanced nutrition so that it could be set up or cured by manipulating soil fertilizer. In England it was regarded as a bacterial disease. Investigations in my laboratories and greenhouses prove to our satisfaction that the disease is a virus disease and this has been confirmed by the work of Dr. Gardner and Dr. Kendrick in Indiana. In fact, Dr. Osner over ten years ago demonstrated that this disease was due to a filterable virus, but he did not publish a paper on the subject.

The disease may attack plants of all ages, but the time of the attack and the severity of the attack are modified by the condition of the plant, succulent plants being more susceptible and more severely attacked. The stem shows brown slightly sunken streaks varying in length but usually about ⅜-inch long. Sometimes the brown streak will be several inches long and perhaps an ⅛-inch wide or more, due both to the coalescing of many smaller streaks and to breakdown of greater extent due to a more acute condition. In our experience this stem streaking has occurred just above the first truss. If the disease is acute the upper part of the plant very soon begins to wilt and the whole plant dies. In most cases, however, the leaves above the first truss up to about a foot show much killing of leaf tissue and sometimes those leaves die altogether. The stem above however grows on as a long straggly vine-like growth with small mottled corrugated leaves, utterly useless for the development of fruit. Speckling and streaking also show up in the blossom and on the fruit one may find slightly raised brown areas or slightly sunken brown patches which later become surrounded by a rather wrinkled area. Since the actual origin of the disease is in doubt recommendations can only be made in the light of our present knowledge.

Since aphids can transmit the disease they should be kept out of the greenhouse. Greenhouse men when disbudding or pollinating may also spread the disease so that they should take care when performing these operations not to bruise plants more than is possible because it is difficult to say whether a plant has streak or not until they begin to appear. Since we have shown that by using the juice from diseased potato, etc., and mixing this with the juice of the tomato plant, streak results it is not advisable to grow in the same or nearby greenhouses such plants as petunias, tobacco, pepper, egg-plant, Jerusalem cherry or potato because aphids may pass from one to the other. We are even testing the juice from lettuce in order to see if lettuce mosaic combined with the tomato mosaic



Complete wilting of a tomato with severe streak.



Tomato streak showing on the stem of a plant near the first truss.

may cause streak. Since succulent plants are more susceptible than hardier plants attention should be given to watering and ventilation as well as to fertilizing in order to prevent too succulent a growth. The recommendations of Howitt & Stone regarding the use of acid phosphate and potassium sulphate and reducing the use of nitrogenous fertilizers should be borne in mind in this connection. Finally while I cannot say that tomato streak is or is not carried over in root fragments in the soil so that infection may occur in transplants I feel, however, that attention to this point might well repay the grower. It may not be necessary

to change the soil and I would suggest thorough and deep cultivation or steam sterilization as a good precautional measure.

QUESTION: Do you think that a tomato with blossom end rot is fit for canning purposes?

DR. DICKSON: I see no reason why, if you cut off the diseased part, the rest of it should not be all right.

A MEMBER: I think Mr. Sanderson has had as much experience as any one with Tomato Streak, and he would make the statement that proper balancing of fertilizer would at least check it.

In connection with spread of Mosaics: frequently the average grower has not time to examine each plant. I wonder if you would make a few suggestions in connection with Cucumber Mosaic.

DR. DICKSON said he was not in a position to make recommendations in connection with Cucumber Mosaic, as he had never had it under his notice in Quebec. And upon request from the same speaker to incorporate these recommendations with his paper, Dr. Dickson said he would do that although they would not be his own recommendations.

GROWING VEGETABLES IN GREENHOUSES

PIERRE DEGUIRE, Cote-des-Neiges, Que.

In asking a vegetable grower from Quebec to give you a paper you have created a happy precedent which, I am convinced, will be continued in the future.

These gatherings of men who are growers, with the same aim and faced with the same difficulties, with a view of finding a solution of the problems which have crippled and are still crippling the industry, cannot but work to the mutual advantage of both Provinces. Our troubles are practically identical, and we must work together, having always in view the interests of all growers. The sooner the growers themselves realize this, the better for all concerned.

Indoor growing of vegetables is far more advanced in your province than in ours, due mostly to different climatic conditions.

If our methods of culture differ from yours to such an extent as to seem perhaps opposed to recognized standards I am no professor but only a humble grower who produces vegetables to the best of my knowledge—sometimes realizing a fair profit—sometimes having to do some thinking to make both ends meet.

There were very few changes in indoor growing of vegetables in Quebec previous to 1922, when the importation of vegetables from the United States was more or less a negligible factor. The principal crop then grown was lettuce, the Grand Rapids variety, along with radishes, water-cress, parsley, tomatoes, garden mint and sometimes a few cucumbers. Rhubarb forcing was also indulged in by a few enthusiasts.

The soil, after being well manured was able to produce four consecutive crops, without any rotation, being left to rest during the months of June and July. It was manured in August, planted in September, refertilized during the winter, and we could count on good crops which always sold with a reasonable profit.

From 1908 to 1921 inclusive, we realized an average of 27½% net profit on invested capital for our Grand Rapids crops for an area of 25,000 square feet.

In 1922, 1923 and 1924 on an area of 10,000 square feet we were not able to realize more than 10⅔% net profit on invested capital. Had our greenhouses been built in 1925 we would have realized about 5%.

We grow just as good crops now as we grew in 1910. This difference in the earning power of our invested capital can only be attributed to the wholesale importation of lettuce from outside which has caused an unjustifiable prejudice against our Canadian produce.

This accounts for the transition stage from one crop to another, started on a small scale in 1922 and which has now become the rule. Of course, the producer from Quebec, as well as all other producers, wishes to make maximum profits. He must not only aim to satisfy the consumer, but also survey the over production conditions which are the cause of the sudden drops in prices. The problems of gauging supply and demand are rendered practically unworkable when it comes to importations.

To-day, in the Montreal district, the only lettuce crop that brings a remunerative price is that which can be marketed between April the 10th and May 15th. For the tomatoes, between November the 15th to July 15th and more so during the Christmas holidays. Our winter being so cold it seems more advantageous to grow lettuce during the winter. It requires much less heat than tomatoes, and as I mentioned before, we are able to get good prices for our early spring crops.

We have adapted the following system of rotation—one crop of tomatoes for November and December—one crop of lettuce for April and early May, followed by one crop of tomatoes for June and July. Along with these we grow radishes, cress, parsley and mint practically the year round.

It is very difficult to have fixed dates for starting the crops. It depends on climatic conditions and the way the houses are running, whether south-east and north-west, north-east and south-west, etc. We sow our tomato seed for our fall crop during the first week of June in the ventilated part of the greenhouse and we repeat our sowing about ten days later for fear of a poor germination. The plants are well watered and sprayed often with bordeaux mixture. We "prick off" the plants, when two and one-half inches high in beds, about three inches each way. Later they are transplanted in five-inch pots. About mid-July, we apply six inches of well decayed manure which is afterwards covered with six inches of good clean soil. During the first days of August, we make the last shift from the five-inch pot to the permanent beds, we allow three feet between the first and the second, one and one-half feet between the second and the third, repeating the operation. The plants are set twenty inches apart in the row, in a hexagonal way, to insure good distribution of air and sunlight. The plants are covered with cone-shaped papers for a few days to protect them from the sun. They are trained to a single stem by pinching off lateral shoots and staking them. When these have reached the desired height they are also pinched off. We use wooden stakes one and one-half inches in diameter and five feet long. The houses are disinfected by burning tobacco stems when necessary.

A small application of nitrate of soda to each plant, when the fruit is set, has given us good results.

Pollination is done by jarring the plants with a piece of rubber hose, every other day, when the flowers are sufficiently developed to discharge pollen. We can also use a rabbit's tail at the end of a stake and brush the flowers. We try to have a minimum temperature in the houses of 60°.

Our lettuce seed is sown in November and the seedlings kept at a temperature of 45 to 50° in order to insure good strong plants. We must watch for excess of humidity and if we get too much of it, we must raise the temperature at once and give more ventilation.

Our tomatoes are harvested in the forenoon and marketed locally in ten pound baskets.

As soon as the crop is over, we pull the vines, spade the soil well and fertilize it using a 1-3-1 mixture, and the lettuce is planted seven inches apart in a hexagonal way. This is done in January. In the meantime, we sow the seed for our spring crop of tomatoes, using the Bonny Best variety, in the warmest part of our greenhouse.

The lettuce plants are well watered while young, but as soon as the leaves cover the ground, very little water is used for fear of encouraging lettuce drop. The temperature is kept at 40 to 45° during the night and 55 to 60° during the day. To speed up vegetation, we give it a couple of good cultivations with applications of nitrate of soda.

The lettuce is ready for sale at the beginning of April and it is classified and marketed in crates, locally.

As the lettuce is being sold, the soil is worked again for our second or spring crop of tomatoes. This time a good application of bone meal or bone flour is given to the soil and we carry on as for the first crop.

I have tried, to show you the method we were forced to adapt in order to get some revenue out of our greenhouses. We used to grow four crops of Grand Rapids lettuce, now we grow only one. We are able to grow tomatoes with a certain amount of success. How long we will be able to continue to do so, I do not know. It is for us to combat the importation of vegetables that we can grow here.

If greenhouse vegetables pay less to-day than they used to, it is not because of a noticeable increase in the number of greenhouses, for there are very few constructed to-day in comparison with the increasing demand for vegetables. It is because of the wholesale importation and dumping on the market of crops which we can grow and cost us more to grow than what is paid for surplus stock grown south of us.

I have given you a very brief analysis of the methods we follow as growers in Quebec, in our struggle for existence—I do not pretend to insinuate that all the growers in Quebec follow exactly these methods—for there are some who probably carry on entirely different methods or combinations of methods. The figures I have given you are the results of personal book-keeping, observations and conclusions in regards to our own experience with indoor growing of vegetables.

HANDLING OF FRAME CROPS

W. J. Cooke, Kingston

One of the first considerations before a grower should decide on growing frame crops to any extent, is to determine whether he has a suitable location.

A frame yard must be sheltered from all prevailing winds, else in mid-May, when all glass is out and well aired, a sudden squall will appear, lift some sash and toss them over the rest and the results are disastrous.

Of course freedom from shade is necessary, and close proximity to buildings, especially greenhouse and tool house, are necessary.

The soil should be of a sandy nature and well drained. If water lies under beds from the melting snows or heavy rains of spring, you cannot hope for healthy growth. If your soil does not drain readily, it will remain wet on the surface and poor growth and disease is the result.

The soil for hotbeds is usually prepared soil and is of two kinds. One is prepared for seedling crops and another for growing crops to maturity. For growing seedlings, the soil should be rather poor in nitrogen and with very little humus. This is better prepared a year in advance. The best method is to remove an old sod to the depth of eight inches from a sandy piece of land. This is piled and preferably turned once during the previous season.

The older gardeners thought it was the sod rotting that made it valuable, but later research work shows that the great increase in beneficial bacteria that takes place when land lies in sod, makes of this indeed a live soil. The other great advantage of this soil is that it is as nearly as possible disease free.

For growing crops to maturity in beds where soils must be prepared in advance about one third by bulk of composted manure is added to the sod land.

This composted manure is obtained in the proper condition by spreading rough manure about ten inches deep on a fallow piece of land and allowing it to weather for a season. It is then in very fine condition for soil mixing.

Many kinds of sash are advocated. We build the cheapest sash possible. It has glass sliding in grooves that enter from either end of the sash. Putty glass takes too long for replacement. It has lapped ends instead of dovetail. Less scientific but cheaper to make. We get them sawed at the mill and put them together ourselves. Old virgin pine is probably best but with us is unobtainable. Cypress is good but too heavy for a one man sash. We tried cedar last year and it proved good. They are put together with brass screws, as nails rust out and loosen the sash. The holes for the screws are drilled in the bars at the mill. We have stopped painting our sash as water enters through the grooves and cannot evaporate readily through the paint. We have unpainted sash fifty years old. The cost of these for wood and milling is about $1.50, screws fifteen cents, glass fifty cents, and two men put together about forty per day.

For early beds, frames are made twelve by six feet to accommodate four sash. These are fifteen inches in height. Cedar is used for corner braces as that is where the frames first decay. One cross piece of two-by-four material is used in the centre. This allows a man to walk from one side to the other. For later ranges, twelve-inch lumber is staked for support for the sash instead of permanent frames.

It is in the cost per square foot of growing surface that the great interest in frame cropping comes in, as compared to the greenhouse cost of from $1.25 up per square foot of soil, the frame crops have a cost of about twenty cents per foot. This makes frame cropping a valuable adjunct to greenhouse work as many crops can be moved from the greenhouse into cold frames and this valuable greenhouse space more profitably employed.

Ventilation of frame crops is important and is often underdone. When hot manure is below and the hot sun above it is almost impossible to overventilate most crops, but cucumbers must be ventilated away from the wind. We find pegs made of blocks of wood better than side shifting the glass, especially as the season advances. If disease is showing and the weather is good it is often advisable to remove the sash entirely during the warmer part of the day to thoroughly dry the top soil.

In a large yard irrigation is a necessity, especially towards the end of the season when the sun becomes very warm. One line of irrigation will cover six ranges.

Watering should be done thoroughly when needed, preferably in the morning of a sunny day as it is necessary to have the top soil dried as soon as possible. We often leave our glass off some time after watering to accomplish this. More trouble is caused in hotbeds and cold frames from overwatering than any other cause. Overwatering leads to the subject of diseases and in growing seedlings the worst of these is the damp-off fungus. It naturally follows overheated and overwatered beds in combination. Stirring the soil after watering so that it dries on top is a good method. Thorough ventilation also helps and a dose of semesan at the first appearance of the disease or before is a great specific.

Lettuce rot and soft rot of radishes are a sign of too high a temperature and a need for changing the soil.

The angular leaf spot and downy mildew of cucumbers are hard to control but seed disinfection with semesan will help. The cucumber wilt calls for persistent efforts to repel the striped cucumber beetle which spreads the disease.

The celery blight can be kept in check in the beds with bordeaux dust.

The crops finally grown are not numerous.

Plants for the garden and for sale, both flowers and vegetables, are an important crop.

Beets and onions for transplanting are sown early in cold frames. Cabbage and cauliflower are given a little heat for germination. Peppers, tomatoes, cucumbers, melons and egg plants require hot beds for germination. Celery requires only moderate heat for germination but must be sown shallow and kept moist by covering with sacking. Radishes and spinach are sown early in cool beds to be grown to maturity.

Once transplanted, lettuce is planted six inches apart in moderate heat and a potted cucumber intercropped every six feet. This takes the bed after the lettuce is cut.

Once transplanted, celery is planted eight inches apart and grown to maturity; this requires very heavy watering towards maturity.

The Quebec growers grow cauliflowers to maturity under glass. Seed is sown in February and March, the plants then transplanted into two-inch pots, and after five weeks placed in permanent beds eighteen to a light intercropped with transplanted lettuce thirty to a light.

They have an early dwarf Erfurt variety which they claim to be good for frame work and an Erfurt Grant for cold frames and outside planting.

MERCHANDISING LEAF LETTUCE

Louis F. Miller, Toledo, Ohio

I have followed market gardening since leaving the grade school at the age of thirteen and have found it so fascinating that I derive my greatest pleasure from mingling with other men in the same line, and incidentally gathering new ideas, that may be of profit, so you see my motive in coming here is not altogether unselfish. How well I recollect our first days of growing leaf lettuce in hot beds.

Forking over a huge pile of steaming stable manure in the dead of winter, packing it into the frames, uncovering the heap of soil we had stacked up the summer previous, getting it all ready to set, and then watching for a favourable

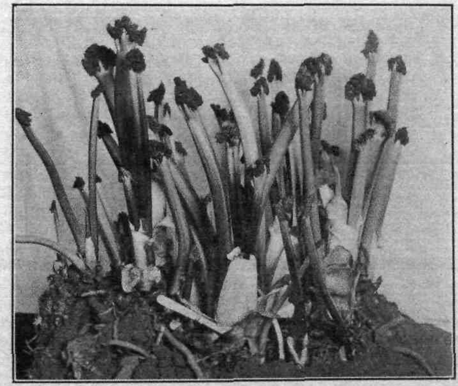
day to get them planted. We were obliged to do this work in winter, as we used the beds for forcing melon and tomato plants for the field, and the lettuce crop had to be out of the way by a certain date. We figured that the lettuce crop paid for our strenuous winter work, and when the first of May rolled around the beds were all ready to start our early plants. You will note that I say "we," that means my brothers and myself, who all seemed to become wrapped up in the work, the outgrowth to-day being a close corporation of five brothers, the M.F. & G. H. Co. capitalized at $100,000, with property valued at approximately $300,000, represented principally by a range of close to seven acres of glass in lieu of the hot beds, besides the estate left by our father which is still intact. In those days the lettuce was cut, dipped in water, packed into any old second-hand barrel, and taken down to the commission house. The commission man rolled out another old barrel, set it on the scales, marked the weight on the side, the lettuce was transferred from one barrel into his, the weight computed, six per cent. deducted for shrinkage, and we were paid. We had no telephones in those days, so orders had to be taken for the next day's delivery, with the customary wrangling over the price. Finally, one of the larger growers, producing lettuce throughout the winter in a large greenhouse, by experiment proved that 78 lbs. of dry lettuce, packed into a second-hand sugar barrel, and then dipped barrel and all into a big vat, would weigh out 90 lbs. of lettuce three or four days later. This of course, made for speed and convenience in handling at the commission house. Later on, as customers called for a smaller package, the standard barrel was also used, 52 lbs. of dry lettuce filling it nicely and weighing out 60 lbs. after being dipped into the vat. The eight lbs. of water, of course, was the water in the stack, a standing joke on all markets, where leaf lettuce is handled. Following up the modern tendency of labour saving and sanitation in handling, the demand for a 10-lb. basket grew until it became practically imperative upon us to supply that demand, so about four years ago we arranged our weighing and dipping apparatus accordingly. With our present equipment and a full crew, we are able to cut, weigh, pack into paper-lined baskets, tie on cords and dip at the rate of 200 baskets per hour. This, of course, is not quite the whole story of the package, as some points use a bushel basket containing 15 lbs. and one grower has used a 3½-lb. basket for so long that it has practically become a trade mark.

So much for the package—now to get down to merchandising. As mentioned a moment ago, in the old days when we had no telephone, the only method of sale available was for the grower to pack up his lettuce, take it to the buyer, whether it be commission man, grocer, peddler or housewife, show it to him (or her) agree on a price and close the sale. Personally, and as a matter of good business, it has always seemed to me that it behooves us growers to keep closely in touch with modern developments in merchandising. At times, it would seem that the public market is getting to be an out-of-date institution. On the other hand, the observance of the tremendous amount of produce that passes through the Eastern market of Detroit in the summer season will tend to prove the opposite. However, who can say that such a market will always endure? Already we hear rumors of buyers going about among the growers who occupy that market and making contracts for large acreages of sweet corn, tomatoes, etc. These contracts stipulate "each payment at the farm" and what an inducement that is to a grower. No night trips with an expensive truck with all their attendant hazards, no loss of sleep, just concentrating his attention on maximum, efficient production. We should also observe the development of the chain-store idea. The buyers mentioned seem to be connected, directly or indirectly,

with the men who buy for the chain stores. If the buyer for the chain stores is sure of a dependable supply each week without wasting his time tramping through the public market, and dickering with a dozen or more growers, he will naturally ignore the public market in the interests of efficiency and dependable supply. To apply that line of reasoning to our leaf lettuce game, let us assume that a chain-store buyer is in the market, for say, 400 baskets of lettuce. Here is grower Smith, with fifty baskets, there is Jones with sixty, over there is Black with 100, and still farther over there is White with 150. The buyer closes with Smith, Jones and Black, but when he gets around to White finds that he (White) has sold out. This, of course, makes it necessary for the buyer to scurry around for the balance of his requirements. Under these circumstances, would it not seem to be good business for all concerned if the supply of all four growers were handled through the one centre? There enters an argument that remains unsettled in our Toledo section to this day. To go back into history a few years. Back in 1915 there was organized in our city the Toledo Gardeners' Exchange Co. Incorporated, a stock company confined to growers only, five shares minimum and ten shares maximum, and I was elected secretary-treasurer. We handled both outdoor and greenhouse products, making a charge of ten per cent. for selling. We soon found, however, that our method was unjust to the greenhouse men, the ten per cent. being earned so much more easily on high-priced greenhouse goods than on cheap bulky truck crops. Se we changed the plan, and based our selling charge on the cost of operation, computed each week. This corrected the injustice in a measure, as at times when a rush of greenhouse crops came on at good prices, our selling cost was down to five and even four per cent. in some weeks. We created a little surplus. During about two months in the summer the cost of doing business would exceed ten per cent., but we passed a resolution to use our surplus to make up this deficit, so at no time were the growers assessed more than ten per cent. However, just as we had gotten our Exchange working nicely, after four years of study and hard work, and had most of the difficulties ironed out, some ambitious candidates for public office, looking for campaign thunder, suddenly discovered in our Exchange, one reason for the "high cost of living," got an injunction in the Courts on us and the upshot was that the Federal Court ordered us to close our doors. An interesting sidelight comes in here. From the drift of newspaper comment, at the time on the high cost of living, I was quite sure our Exchange would sooner or later be a target. Mrs. Miller and I had all arrangements made for a motor trip to Montreal, she having two sisters living in or near that city. We had arranged to start on a Monday morning and on the preceding Saturday at noon I remarked that by the time the prosecutor got down to his office next Monday, we would be half way to Buffalo. Not that we were fearful of the result, but we disliked the idea of having our plans for the trip upset. After a few days in Canada, came the front pages of Toledo newspaper with glaring headlines, sent to me by my brother, special delivery, the most juicy morsel in the whole story being the fact that the Secretary-Treasurer of the Toledo Gardeners' Exchange ordered closed by the Federal Court, had run away to Canada and could not be found. This all happened about the middle of August, and after battling about in the courts until about November 1st, the final order of the Court was laid down for us to cease business and the death knell of the Toledo Gardeners' Exchange was sounded. Incidentally, the officers and directors were tried by jury on the criminal charge of violating the anti-trust laws, and escaped a penitentiary sentence only by reason of a disagreement of the jury. When the final order to close our doors was issued, the directors hurriedly made arrangements

with a large Detroit commission firm to take over the lease of the building and all personal property, to establish it as a branch of their business and to sell our products on a ten per cent commission basis. The handling of outdoor products by this firm proved impracticable, so the outdoor truck grower members drifted back to the public market. A number of greenhouse owners also became dissatisfied with the new arrangement and drifted away. Here is a little item of psychology. Why is it that a sales agency is always so intent on impressing upon its customers the fact that it is a direct representative of the growers? That particular statement must be a peculiarly valuable asset to any sales agency, according to our experience. At present in Toledo, we have a one-man selling agency who calls himself Gardener's Exchange, and another, two-man concern, neither one of whom is a grower, styling themselves the Toledo Growers' Association. The Commission man who took over our Exchange has notations on his stationery and on his delivery trucks: "Selling Agents, Toledo Hot House Growers." In addition to these three agencies, several large concerns sell their own output on the open market, so you can readily see we have competition with a vengeance. Why do we allow this unbusinesslike condition to exist? One reason is that those who were interested in the Exchange, myself included, became so thoroughly discouraged with the outcome that we had not the heart to start again, notwithstanding the fact that since this all happened, laws have been enacted which enable producers to legally do all the things, marketing, pooling, collective bargaining, etc., that were objected to back in 1919. What such an Exchange would mean to our corporation in dollars and cents to-day, you may judge for yourselves from the fact that we paid commissions on the ten per cent basis, of some $8,400 last year, whereas had we been operating the Exchange ourselves, the cost of selling would have been not over seven per cent., making a saving of approximately $2,500 on the year's business. To offset this, however, our commission man will submit the argument that with his prestige and selling force raised up to a high degree of efficiency through years of experience, he is able to command prices higher than any sales manager could, to more than overcome the difference in the percentage of commission. That is a question for the grower to decide. Shall we, producers, set up and operate a selling agency of some kind, with all the expense, worry and responsibility such as venture involves, or shall we employ a selling organization already set up and operating with a proven and high degree of efficiency on a percentage basis. It would seem to me that most thinking men would favour the latter plan. In Toledo to-day we have hopes. It seems to have finally dawned upon the greenhouse owners that we have been neglecting our opportunities in a most shameful manner. With three separate selling agencies dividing the output, we are beginning to realize that we are simply competing directly with each other to the detriment of all concerned. After several spirited meetings, we have finally incorporated the Toledo. H. H. Co-operative Association and hope to get matters boiled down to where we can actually offer the entire output of the greenhouses in the Toledo territory to one selling agency. We hope that by offering a large volume, we may be able to demand a lower percentage of commission, and thus to capitalize for our own profit those seemingly magic words, "Growers' Selling Agent." Even with ruinous local competition eliminated to a greater or lesser degree, we still have the menace of outdoor head lettuce from southern and western points hanging over us. How vividly I recollect the occasion of my trip to Erie, Pa., to place the contract for two boilers when we began the erection of our present range. Stopping at Ashtabula on the return trip, one of the pioneers in the greenhouse industry spoke in this cheering fashion:

"Do you know, Mr. Miller, I am fearful of this southern and western competition. It's getting worse all the time, and you know it is only a question of transportation that stands between us and death." That all happened some sixteen years ago, however, and we are still on earth, growing and marketing leaf lettuce. Nevertheless, I feel that, as business men, we leaf lettuce growers are not following up our possibilities as we should. Here we are with millions of dollars invested, carrying on an industry that involves tremendous hazards and heavy costs in depreciation of plant and equipment, and we say not a word to the public about the high class goods we produce. It is quite gratifying, however, to note the growing tendency of men in our line to mingle more and more and to recognize the possibilities which are being so shamefully neglected. For instance, would it not be good business to point out to the consuming public in our nearby markets, that in purchasing head lettuce, they are paying for a railroad haul of 2,000 miles or more that does not add an iota to the quality of the product?



Forced rhubarb.

Hot house leaf lettuce is without a question,superior to outdoor grown head lettuce. This by reason of being grown under roof, under the most perfect conditions. Furthermore, the money expended for products grown nearby remains in circulation in the community instead of travelling to some far western or southern state. Advertising has been taken up locally in Cleveland and in Cincinnati, but to my mind, advertising to be effective, should be carried on in a broad way, covering, say, about six states where the production of leaf lettuce is heavy, Illinois, Indiana, Michigan, Ohio, New York and Pennsylvania. It is to be hoped that with the spirit of organization in the air as it were the good work will spread until some businesslike plan is perfected whereby the public will be educated up and the consumption of our product will increase many fold. A little propaganda of the right sort would work wonders, as for example, a health column in a prominent Toledo daily paper has this to say: "Lettuce is a relish one may enjoy every day of the year: Lettuce is the peer of all fillers, having a

fuel or nutritive value of only five calories to the ounce. One potato is equivalent to about a peck of lettuce in nutritive or fuel value. Raw lettuce is second only to raw cabbage as a natural cleanser of the teeth during mastication. Lettuce contains almost as much calcium (lime) as cabbage. Lettuce is one of the best sources of food iron. Lettuce contains more phosphorus than cabbage. Lettuce is one of the most economical of salad or relish items. Lettuce is a natural aid to intestinal digestion." So I would say we should always keep in mind the old saying: "The Lord helps those who help themselves," but even though we tillers of the soil may be assured over and over again that our industry is the cornerstone of national security and prosperity, and, as we were told during the war, that the fate of nations rested upon us, the fact remains that our product is of no value to the people until it is delivered to the kitchen, either of the housewife, the restaurant or the hotel, and the question then arises, shall we, growers, so deliver it, or shall we delegate this service to someone else. Observing the tremendous spread of our modern cities, it would seem that auy grower attempting to cling to old-time methods of merchandising will soon find himself out of step with the industrial procession. The distributor to-day is an integral part of our complex system of civilization, so instead of attempting to eliminate him, let us sit down face to face with him and talk business in a business-like manner. Let us cast into the discard all class distinction, abandon the old-fashioned custom of "roosting on our own little dung-hill," mingle freely with our fellowmen in all lines of business, and in that way I am sure you will all agree with me, we shall soon grasp the true significance of the word "merchandising" and the correct interpretation of it as applied to our business.

I bring from the Toledo Hothouse Co-operative Association and the Ohio Hothouse Co-operative Association, the most hearty greetings and good wishes for your success. Let us visit together at every possible opportunity for our mutual good, but especially to augment the spirit of goodwill and fellowship that now obtains in such a remarkable degree between us, even though we are separated by a national border line.

CAULIFLOWERS, SNOWBALL, DWARF ERFURT, AND GILT EDGES

ARTHUR CARLTON, Toronto

Cauliflower is generally regarded as most delicate member of the cabbage family.

It has been a very important field crop. The cultivation has been extended to the Great Lakes district, and in other sections providing suitable climatic conditions.

It is a very difficult crop to grow, many uncertainties attending its production. The young plants are subject to damping fungi. A hard frost may stunt the growth, causing the heads to "bolt" or "button." Poor seed or dry weather at the time of heading may cause the same trouble. On account of these uncertainties, a great many growers do not attempt growing cauliflowers.

In my twenty years' experience, I have always found a good demand for large white heads.

In starting early cauliflower, I make two or three sowings from March 1st to 20th, the same way as my early cabbage. Greater care must be exercised, the soil sterilized and made only moderately rich, sowing the seed in drills one

inch apart in flats, covering with good clean sharp sand, giving one good watering with càn, using a fine hose. This supply of moisture should germinate seed and keep the plants in good growing condition until they are one inch high. This is the proper time to transplant. I have had practically no loss from transplanting when one inch high.

By setting them in flats, one inch apart, this will hold them for three weeks or a month, when we transplant again into two and one-half inch pots, using good loam, and constant supply of moisture for the first two or three weeks until the plants are established. Over watering should be carefully guarded against.

My aim is to produce moderate, healthy, unchecked growth from seed growing until plants are established in the open ground, the last week of April or beginning of May. These pot plants are then plunged in sand or ashes in good tight cold frame to prevent them from drying out. By this method, I get a good stocky plant to set out. I also have excellent results from transplanting into flats two by two inches apart, this does not give too much space, but provides free circulation of air around plants which may be removed from flats with plenty of soil or compost, so that the growth will not be materially checked. If you really want success with early cauliflowers, pot culture is the best. Early plants should not be planted in the open until danger from hard frost is passed.

We plant both early and late varieties eighteen inches by thirty inches in good rich loam. The most important factor in preparing soil for cauliflower is the question of moisture and good drainage. Many failures are due to late ploughing. The only safe practice is to plough early in the spring and save the supply of moisture.

Animal manures are the best fertilizers for early cauliflowers. They may be used with the greatest freedom.

Our profits generally are greatest, when we have ploughed in forty or fifty tons to the acre, also using one-half ton of complete fertilizer, working well into the soil.

Weather permitting, we start planting in May, setting plants eighteen by thirty in the field. Four or five days after planting, we use corrosive sublimate, four ounces to forty gallons of water, giving the plant at the base half a cupful, repeating dose eight to ten days later.

This material may be applied with a knapsack sprayer, nozzle removed with a small apparatus designed for the purpose or with a bucket and cup.

Cultivation should begin as soon as plants are sufficiently erect and be continued as late as possible, crowding between the rows even though some leaves are broken. However, if the cultivating is done between the hours of 9 a.m. and 4 p.m., when the leaves are limp and bend readily, very few will be broken.

I take great care in protecting the heads. The market pays highest prices for pure white heads. This cannot be produced without protection from rain and sunshine. I always try to go over the patch twice a week and tie the leaves over the heads, in such a manner as to shield from rain and to prevent the sun's ray from reaching the delicate heads.

As cauliflower is easily damaged, it should be handled with the greatest care. Crates are best for packing. They usually hold about two dozen heads.

This product should go to market in the most dainty condition. Paraffin paper wrapped about each head will help to accomplish this purpose. Such a plan pays, particularly when prices are high.

For the later crops, I make three sowings in the month of May, and one early in June, drilling them in drills sixteen inches apart in the field. The general practice is to plant early enough so that heads will form before the hot mid-summer weather, and to start the late plants so that they will begin heading with the lower temperature of the early fall months.

GROWING OF EARLY CABBAGE

A. E. LUCAS, London

In the first place, we try to obtain the best seed of the variety which we grow, namely "Golden Acre." This seed has all been treated for any disease which might cling to it with a solution of bichloride of mercury by the firm from whom we buy. We decided on Golden Acre as the best for our district after trying it against Early Jersey Wakefield and Copenhagen Market.

Early Jersey Wakefield is an early cabbage but we can produce a good hard head of Golden Acre as early, and our market prefers a round cabbage to a pointed one.

Some seedsmen claim that Golden Acre is only an offshoot of Copenhagen Market, but they list it as a distinct variety. This year is the first time I have noticed any seed firm changing and an American firm claims the Golden Acre is a Copenhagen cabbage and he is this year listing it as Copenhagen Golden Acre strain, but he has another strain called Viking, which he claims is five days earlier.

We are, this year trying out the Viking against his Golden Acre strain and if we find his claim is good, with us, we will change to Viking strain.

We sow our seed in rows in haddie trays about February 17, ¼-inch deep and every four or five days until enough have been sown. They are pricked out just after the second leaves are showing, about March 10, in the greenhouse ground beds, two inches apart each way.

When they begin to touch one another, about the last of March, they are potted in 3-inch and 3½-inch pots. We have potted some in 4-inch pots but did not find any advantage, so discontinued that size. If we do not have enough pots, as sometimes happens, we transplant into trays, 11x22x4, placing 40 plants to tray, eight one way and five the other. As soon as plants are potted or trayed, they are watered well and placed in a cool greenhouse where the growth would be slow but sturdy. In this way any weak plants soon show up and are thrown away.

The soil used is greenhouse soil, which is fairly light loam. This transplanting is finished by April 10 and plants are left in pots until safe to take outside.

About one week before we plant in the field the plants are taken outside to be hardened off before planting in the ground. If it feels like a heavy frost the first two or three nights they are given protection but after that they take what comes.

We begin planting in the field about May 5 and all plants, 20,000 or more, are planted within a week of date we started, weather permitting.

The plants are set in rows 15 inches in the row and 30 inches apart.

All pots and trays are soaked with water before going to the field and this helps to hold the earth on the roots. The plants in the trays are cut in squares leaving a square of earth to each plant.

The ground we grow our early cabbage on is a light loam. This has all been plowed and manured, about 25 tons to the acre, the fall before. In the spring the land is given a light coat of fresh manure and plowed again. The land is then worked down and an application of commercial fertilizer is applied broadcast, 1,200 lbs. to the acre. After this has been harrowed in we plow a furrow about 5 inches to 6 inches deep every 30 inches and in this place commercial fertilizer, about 300 to 400 lbs. to the acre, in this way leaving a broad

line of fertilizer. This is mixed with the soil by a spiked toothed strawberry cultivator. We try not to open too many furrows at a time on account of drying out.

We are now ready to plant. Three or four people place the plants on the side of the furrow the correct distance apart while others plant.

The cultivator is started on these cabbage the same day as planted and an average of twice a week thereafter.

As soon as the plants have started to take hold in the ground, a side dusting of nitrate of soda is applied at the rate of 200 lbs. per acre. Through the growing season three applications are given.

Last year we used a commercial fertilizer 2-12-6 on cabbage, but did not see any difference in the growth and quality to the 5.6-8-6. I might say here that our ground does not seem to respond to applications of potash.

Up to the present we have had no trouble from the maggot, although we keep a supply of bichloride of mercury on hand in case it is required. We watch very closely for the maggot egg just under the ground around the stem and if they are there they can be easily seen. We have never yet lost a dozen plants from maggot, so deem it unnecessary to go to the labour and expense of applying the cure.

Last year we carried on an experiment in collaboration with the O.A.C. in Nitrogenous Fertilizer for early cabbage. The experiment was for the purpose of finding out how the new Synthetic Fertilizers compared with the two we had been using.

In the selecting of the ground, we were careful to get it all as uniform in quality as possible. This was a light loam, manure had been applied and ploughed under as with the other cabbage, but commercial fertilizer had not been used.

We had 7 plots composed of 5 rows in each plot, 2½ feet apart and 70 feet in length.

Two of these plots were for Ammonia Sulphate 20%, one Leuna Salpetre 26%, one Check, one Calcium Nitrate 15%, one Sodium Nitrate 15% and one Urea 46%.

The fertilizer was applied at the rate of 200 lbs. of Sodium Nitrate on a comparison basis.

The fertilizer was applied as a side dressing in these experiments in the same manner as applied to the main cabbage crop.

The plants were all in the ground by May 15 and on the 19th, on plot 1, Ammonia Sulphate was applied, 2 lbs. 10½ ounces. This was done to find if an early application was beneficial.

Ten days after planting, fertilizer was applied to all the separate plots, leaving the Ammonia Sulphate plot alone. The second application was made 12 days after the first, the third application 12 days after the second, thereby having all the fertilizer on the plants within 34 days after planting.

These plots were given the same care and attention that the main crop received, being a continuation of the larger plot.

We started cutting cabbage from the Sodium Nitrate plot on the 30th June, from Leuna Salpetre on July 3rd, from Calcium Nitrate on July 4th, from Ammonia Sulphate July 6th, from Check July 9th and from Urea July 9th.

Although we started cutting on the Sodium Nitrate plot first, the Ammonia Sulphate plot was cleaned up first.

The plot that received Ammonia Sulphate four days after planting, did not seem to thrive as well as the plots having later applications. The plants grew to a certain size and stayed that way for some time.

The conclusions we drew from this experiment is that Sodium Nitrate and Ammonia Sulphate are easier to apply than any of the Synthetic Nitrogenous fertilizers.

All the Synthetic fertilizers seem to draw moisture to themselves all the time.

Urea 46%, when first handled resembled hailstones in shape, is pure white, but in a short time this becomes sticky. Calcium Nitrate 15%, is the worst of the lot for moisture. Sometimes it is easier to apply with a watering can than by hand.

Although the Synthetic fertilizers contained more Nitrate than the older variety, the amount by weight was about the same on account of their lightness.

The Sodium Nitrate and Ammonia Sulphate plots gave larger cabbage and were cleaned up quicker than the others, the Calcium Nitrate being the best of the three varieties.

This experiment was a little late in being started, but it showed us enough about the new Nitrate fertilizers that they had nothing on the old ones, except the price.

By this I mean, for example, Urea 46% costs less per unit, but the work of keeping it from absorbing moisture is rather a hard job.

If these fertilizers could all be placed in the ground as soon as received it would not be so hard to handle, but once let the air get at them, and they become very sticky, the Leuna Salpetre crystallizes as hard as rock.

I would like to hear from any one else who has used these fertilizers. Another year we hope to have the material earlier and then may be able to give more information than the one trial gave us.

ADDRESS

Dr. Poisson, M.P.P.

I was born on the vegetable patch. The county of Essex where I come from is very much interested in vegetable growing. You can rest assured that as a member of the Government any consideration that we can give to the vegetable growers of this province will certainly have my co-operation. They are one of the most important classes of people in our province. They supply us with the delicacies and things for the table that are good to eat and more than that they supply the healthful things.

A couple of friends down in New York, Morgan and Schwab, belonged to the same church and decided to go to confession. They decided they might as well unburden themselves to a certain father and they went to his church, and in the confessional, J. P. took one side and Mr. Schwab the other. The priest came in, and started to listen to Mr. Morgan's oration, declamation of bad deeds, etc. For some reason the priest had a few minutes after, to go back into the vestry and Morgan started to slip out. Schwab called to him, "Wait for me Morgan where are you going?" "I am going home," said Morgan, "he has gone after the police."

Cecil Delworth: If there is one thing more than another that has impressed me the last two years with the work of this Association and the meetings here, it is the closer feeling of co-operation that exists between the grower

of this province and the interprovincial feeling that seems to be springing up,—in short, the better spirit of Canadian citizenship that seems to be growing up. The most noted difference that I see in the industry to-day is the mutual or the greater mutual respect that is felt for each other by the scientific or college man and the practical grower. And just as men who have given their lives have toiled unselfishly to solve the great problems of disease in the human race, those who gave us insulin and cures for small-pox and other great scourges that menaced the whole of civilization (in a lesser degree perhaps, because there is nothing as important as health in the human race) and yet the same unselfish effort is being given to-day in solving the problems of plant life. I wonder if all of us have fully realized the struggles and the unrewarded efforts that have been made by our scientific men to try and solve our problems, and it is only fitting that we ask ourselves if we have done all in our power to help those men. I think a little more encouragement to our scientific investigators would help to solve many of the problems which at present seem insurmountable.

ADDRESS

Lewis Duncan, Toronto: You are faced with the two problems that every producer or manufacturer is faced with—first, the problem or production and second, the problem of distribution.

The problem of production is of great importance—the improvement of the quality of your products, the quantity, the variety, etc. But important as that is, there comes a time, particularly in a highly competitive business, in which the problem of distribution becomes even more important than that of production.

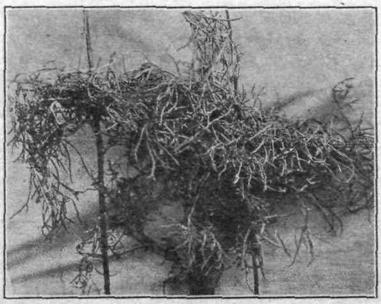
And it is with that aspect of the problem that I have been concerned. Looking at it generally and comparing your problem of distribution with the problem of any other of the producers, one sees certain great differences and certain great handicaps that you are under. Take any reputable business in this country, and one finds that after manufacture has been completed and the products have been assembled and ready for sale, there is not too great competition in their disposal. Either the competitors are reduced to a comparatively small number, and they have their own arrangements or understandings, or it gradually comes to be almost in the hands of one concern or another, with the law of supply and demand working in a modified way and in the way in which it works in all countries of the world; that is to say, supply to certain firms within certain limits—not extremely controlled—and demand operating to fix the price. That is to say, the ideal of the manufacturer is to supply just as much of his product as the demand will reasonably take at a price which will yield him a profit.

Now that is recognized as good and legitimate business in every commercial country. One finds there, if you are not dealing with vital things, that the rule works, and while we do get high prices at times, in the long run you get prices benefitting that manufacturing. If it were not so, all the money invested in that industry would be lost and the people would suffer.

Now contrast your condition: there is no such direction or control. There are attempts to bring about a reasonable price, and, looking at it from the point of the consumer in the city, one might recognize that this or that price would be a reasonable one for the product which you produce; but that has nothing to

do with the problem of its practical aspect. There is such severe competition. There is such unregulated distribution and such defects in the distribution system that you do not, speaking generally, get what you should of the price which the consumer pays. There is no question about that, looking at it from a purely economic point of view. The consumer pays a price which would remunerate you, which would remunerate a manufacturer who had control of the avenues of distribution, if you did not have to go to other persons and two or three firms of middle men before it got to the consumer, and the difference goes of course to the channels of distribution.

It seems to me, that that is one of the major problems facing the different countries, problems which are being taken up in other parts of the world,—the problem of distribution of the food supplies of the country on sound and economic lines with a minimum of waste and overlapping, with as much as possible return to the producer and a reasonable rate allowed to the middle man who handled the product. That is a problem which has not been tackled in this province as a general proposition.



Cauliflower plant producing seed.

It seems to me that that is a problem which could be tackled and should be. Whether any final solution is reached at once or not is a question. Certainly, I think an improvement could be made if it is looked at broadly and all the facts brought together and a like attempt made to find the solution to lessen the evils—do away with the inequalities, to afford a reasonable prospect of not a fixing of price, but of some arrangement whereby prices are not unnecessarily slashed for the benefit of one or two people and not for the great mass of the producers or consumers. Now that seems to me to be a problem for constructive work which might well be undertaken.

Now there are in that various sub-problems: the problem of overlapping, of supplying different districts from adjoining districts or from remote ones, the problem of wasted railway journeys back and forth, shipping goods to places and then having them returned, the problem of exporting, cold storage, and other facilities, and the great regulating problem as I look at it, of free access to the public in consignment centres.

Now *consignment centres* are quite different from centres which are not recognized as such. The great dumping centres make it as easy as possible for a maximum production to go to the consumers, letting it go quickly and directly to the consumer with the great advantage that you save expense and that you clear out your surplus at once, and the great advantage to the consumer that he gets the goods in a fresh state, he is induced to buy more; he pays a lower price than if it goes through two or three hands. There should be in every great consignment centre adequate facilities of public marketing direct from producer to consumer. In the City of Toronto there are farcical facilities for public marketing which prevent a quick disposal of your surplus, which make goods pass through two or three hands.

All the goods consigned go to the Toronto wholesale fruit market, to the commercial merchants. They do their best, they are under highly competitive conditions. I want to correct the impression that they are a closed combine—they are in regard to commission and cartage charges—but they are highly competitive so far as the disposal of your goods is concerned. And they have to clear out the glut of goods every day, and what is the result? The retail merchants of the city, who were not born yesterday, know that they have to dispose of that mass of goods every night and the more thrifty of them come down in the late afternoon and they get bargains. But they do not sell them at bargain prices. There is an erroneous idea about retail competition. If you look at it you will realize that they are only in an area one-quarter of a mile in diameter and they know quite well what the purchase price is that the public will pay. There is limited competition in that area but within the area of a quarter of a mile, or at the outside half a mile, these five or six or seven or eight merchants know that they can get such and such a price. They know the purchasing power of the community, and you know there exactly what you found in the case of the manufacturers—a semi-control of supply and prices adjusted to the purchasing power of the locality. You will find great differences of prices in Toronto—you will find on the hill the same fruits and vegetables will be selling much higher than you will find out on Danforth Avenue or Queen Street, because the people will pay more. If you have that sort of a system, everything flooding in through a narrow funnel where these people are competing against one another to give it away to the retail merchant, that is not sound business at all.

In 1803 the City Fathers received a block of land 5½ acres in extent for public marketing purposes in the town of York. That was thought to be enough for the town of York over 100 years ago. The land where now stands this attenuated public market, bounded on the north by King Street, on the east by Jarvis, on the west by Church, and on the south by Front was given in trust to be used for market purposes and used at first by the Church Wardens and later given to the city to be held in trust for public purposes, and so held to-day, and used against the city, against its trust for the citizens and leased out to the very people in competition with the public market in which they are doing business.

Now there were other markets in Toronto in 1847. The inhabitants of the West end petitioned the City fathers for other markets to serve them, and St. Patrick's and St. Andrew's markets were dedicated. Are those markets in use? They are not. When a North Toronto market was established in inadequate quarters in time it was closed up and the Council of North York decided to establish its own market just beyond the outskirts of the city on North Yonge Street. It is there and it is growing all the time.

Now it is said there is no demand for public markets in Toronto, that the people won't go. I refuse to believe that they won't go, if they will give people

markets more or less properly located, in their own residential districts. For centuries the public market has been an institution of our civilization, and it is essential and absolutely a necessary part of the economic system. It quickly disposes of the surplus, and it enables people to buy at reasonable prices. Look at any city of the world. Berlin, London, Paris. Great markets! Pekin, Tokio, all have great markets. In America also they are being strangled. In Ontario there are public markets in the smaller places, but Toronto has the smallest square foot area for market purposes of any city of over 20,000 population. There is an attendance of only 250 vendors on week days. If you take the number of vendors attending market in the week ending July 26th, starting with Belleville where there was one vendor for every 22 people, you come down to Hamilton and Ottawa, one to every 200, and you come to Toronto, one vendor for every 1,000 inhabitants. As it has no real influence on the disposal of surpluses, it has no real effect on the retail prices. If there were sufficient facilities, the retail prices would be lower. Not that your prices would be lower at all, and you would still find very little difference between the two prices, on the market and in the stores. It is only a question where the control goes.

There are plenty of honest commission merchants. But the Common law duties, which agents are under obligation to perform for those who send goods to them on trust to sell, is in some cases being most seriously disregarded, and that strikes at the very foundation of your business—you must have honest returns, you must have accurate returns, if you are to know, first what the market is, and secondly, whether you are receiving the proper returns from the sale of your goods. There are certain Common law duties which have been laid down by our Courts for hundreds of years: 1st that an agent or trustee must keep accurate records; 2nd, that he must account properly; 3rd, that he must not mix your moneys with his own; and 4th, that he must pay promptly. These are not being lived up to as they should be. In the enquiry that was made in Toronto, an examination was made of a large number of the commission merchants, with the view of finding out to what extent proper records were kept from which a chartered accountant could tell what disposition was made of the goods of the particular grower, and while one might have expected a small percentage of cases in which, due to the hurry of business, there were not proper records, still one found far too many because in 49% of the cases examined it was impossible to tell what had become of that consignment. That is not fair to you, it is dangerous to you, and it is dangerous to all the producers throughout this province, and whether it means that you did not get your full returns in those cases—(I don't believe that in all those cases you did not get your full returns) it is not a situation that is safe and it is against the principles of Common Law.

Then in other cases we could check part of the consignment and the percentage there in which we could trace part of the consignment was 23%, making a total of 72%, in which there was not a proper keeping of records, in which no grower could find out what had become of the consignment. In 28% of the cases it was possible to check it out absolutely and to state that here are all the documents and from the documents we know what happened to that consignment. And in those cases in which we could check A with A, there were 17% of the whole 28 cases in which there was underpayment from the records themselves. Now, speaking generally, those underpayments were not large. There was nothing found there such as was found in the West of gross fraud. We were not able to say, of course, what happened in the other cases, but even 17% of under-payment is not a healthy condition, and when the different com-

mission merchants were asked about it they had different explanations. Some said of course they were under necessity to pay part of one man's price to another grower—a rather startling statement. But it appears to have been a fact for years, that they average between growers—a very shocking statement. Why should Mr. Smith near North Bay lose part of the profit which the excellence of his product entitles him to and that money should go to Mr. Jones in Niagara Falls? Some brokers said: we average between growers, but we do not get anything out of it ourselves. Now that does not check out with facts. In the case of one commission merchant there were 26 cases of under-payment amounting to $43 in a week, not a very large sum perhaps, but a reasonable one.

And how does that work out with the allegation that there is no money made on the return. One case of over-payment amounting to 20 cents in a week. In another case, the books of another firm were examined over a period of six weeks, but while we found the cases which absolutely checked and which the chartered accountants could say, that was disposed of that way and that was paid to the grower, there were 173 cases of under-payment and 53 cases of over-payment. And in that case there was half apparently returned by the firm of what had been retained. That is a serious situation and the reason that it is possible for that to go on is because these duties are what we call civil ones. They are not duties punishable by the Criminal Law, and the only way of enforcing the duties is for the grower to bring a civil or personal action.

That, it does seem to me, is something which could be improved in the interest not only of the growers, but of the consumers, because any of these firms would be most willing to break away from the careless practices which they have drifted into and get back to Common Law practices but they can not do it unless the other people are brought together. Therefore, I suggest that the one great reform, which is brought forward by the Attorney General of British Columbia now is the passing of an act which will define clearly the reasonable and proper duties of commission merchants, making those duties not too stringent, so that they will not interfere with honest business—and making it possible to punish those offences on summary conviction without the necessity of a long trial or the expense of engaging lawyers.

RESOLUTION

Moved by N. T. Sanderson, seconded by Walter J. Cooke,

WHEREAS the fruit and vegetable growers of the Province of Ontario produce fruits and vegetables of a value in excess of $25,000,000 per annum, the proper and economic marketing of which is a matter of great importance to the Province;

AND WHEREAS investigations recently conducted under the Combines Investigation Act have revealed the existence of practices in the distribution of fruits and vegetables, which are prejudicial to the producer and injurious to proper marketing;

AND WHEREAS for various other reasons the distribution and marketing of fruits and vegetables is in a chaotic and unsound condition, resulting in an inordinate spread in price between the producer and consumer;

AND WHEREAS it appears to this Convention of members of the Ontario Vegetable Growers' Association that legislation is urgently required to remedy certain disclosed abuses and practices, and that a thorough examination is

necessary of the existing system of distributing and marketing fruits and vegetables grown or sold in Ontario;

NOW THEREFORE this Convention of members of the Ontario Vegetable Growers' Association respectfully and earnestly petitions the Hon. Howard G. Ferguson and the Government and Legislature of this Province:

1. To enact at the present session of the Legislature a Statute defining the duties of commission merchants dealing in the products of the soil; and therein to provide:

(a) That such persons shall make and keep proper records; shall render true accounts of sales; shall keep moneys received from the sale of consigned products apart from their own moneys; and shall promptly pay over the same;

(b) Appropriate penalties for breach of the said duties;

(c) Facilities for inspection of the records so directed to be kept;

(d) Punishment on summary conviction of offences against the Statute.

2. To appoint a Commission to examine in all its aspects the distribution and marketing of fruits and vegetables produced or sold in Ontario; to report on the defects in the present system; and to bring in constructive recommendations with a view of enabling the fruit and vegetable production of Ontario to be marketed on sound economic lines, to the mutual benefit of producer and consumer.—Carried unanimously.

Ontario Department of Agriculture

REPORT

OF THE

WOMEN'S INSTITUTES

OF THE

PROVINCE OF ONTARIO

1926

PRINTED BY ORDER OF
HON. JOHN. S. MARTIN, MINISTER OF AGRICULTURE

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

PRODUCED BY
The
United Press
LIMITED
TORONTO
CANADA

Women's Institutes of Ontario
1926

To the Honourable Minister of Agriculture:

I beg to present herewith the Annual Report of the Women's Institutes of the Province for the year 1926. It is gratifying to be able to report most effective work on the part of the Institutes in the educational features of their monthly meetings, wholesome social activities, and community work of great variety and of much value.

There have been a number of branches formed during the year, with the prospect of extending the organization to many new centres during 1927. The growth of the organization is shown in the following statistics:

Year	No. of Branches	Membership
1900	33	1,602
1905	208	7,018
1910	612	16,104
1915	892	29,046
1920	925	28,970
1925	1,001	34,259
1926	1,047	35,700

From the proceedings at the conventions, the reports received direct from the branch and district Institutes, and the contributions of the chairmen of standing committees, we have compiled the information contained herein with a view to presenting the full programme of activities in a condensed form.

The success of the Women's Institutes is due largely to earnest effort on the part of the officers to utilize local talent and resources for the common good in their regular monthly meetings. Much ability is shown by the members in preparing and delivering papers and addresses, and much added efficiency has resulted through exchange of information on the part of experienced homemakers in the rural districts.

We beg to refer you to the summarized statments of what the Institutes have accomplished, and to outline the assistance rendered by the Government through the various services as reported below:

Demonstration Lecture Courses

The major portion of the service rendered by the Institutes Branch is through Demonstration Lecture Courses in "Home Nursing and First Aid," "Food Values and Cookery," "Sewing," and "Millinery."

For the "Home Nursing and First Aid" course, graduate nurses with experience and familiar with rural conditions and needs are employed. This course is for the purpose of enabling women in the rural districts to obtain a knowledge of how to care for the sick in the home, what to do in emergency and how to do it; how to render the best possible assistance to the doctor or the nurse; the equipment and care of the sick-room; how to take temperatures, pulse and respiration, and keep records; how to prevent contagious diseases; disinfecting, fumigation, etc.

In the "Food Values and Cookery" course, lesson leaflets are furnished covering the following subjects:

Lesson 1. Vegetables.	Lesson 6. Meat.
" 2. Fruits.	" 7. Meat Substitutes.
" 3. Eggs.	" 8. Flour Mixtures.
" 4. Milk.	" 9. Desserts.
" 5. Cereals and Cheese.	" 10. Salads.

The pupils are also furnished with a leaflet containing a classification of foods, together with comparative food values.

In the "Sewing" course, instruction is given in the class of sewing ordinarily done in the home; how to use the sewing machine, and each member of the class is expected to make one dress.

The "Millinery" course consists of practical work; each member of the class being required to make a hat, and many of them make hat shapes.

Systematic instruction along the lines indicated is very much appreciated by the women and girls of rural Ontario, who not only derive information of real value and acquire efficiency in performance through taking these courses, but are encouraged to extend their reading and take full advantage of the literature available from various sources.

During 1926 two weeks' courses were held as follows:

	No.	Total taking instruction
Sewing	122	2,924
Millinery	67	1,161
Food Values and Cookery	40	1,595
Home Nursing and First Aid	43	1,485
Total	272	7,165

In addition to the above, three months' courses were held at six points, with an average enrolment of sixty-six at each place. In these courses, each person received instruction in "Sewing," "Millinery," "Household Science" and "Home Nursing and First Aid."

Girls' Garment-Making Clubs

There were thirty-two active Garment-Making Clubs in operation during the year, with a membership of about five hundred girls. Some of the groups are now completing the second year course, as prescribed in the manual furnished to the local leaders and the girls who undertake the work. This line of work has proven very effective, the younger girls acquiring information and efficiency of real worth at very little cost to the Department. Women who have done a good deal of their own sewing, and some who have had special training along that line, undertake to instruct the girls one afternoon a week, with the result that at the end of the prescribed course exhibits of work done are very creditable to both teachers and pupils. The Institutes Branch furnishes examiners, and certificates are issued to those who measure up to the required standard. The course prescribed is of a thoroughly practical character, and it is hoped that local leaders will be able to give instruction and leadership along other lines to the girls, thus placing them in a position to take full advantage of the more advanced instruction offered through the regular demonstration lecture courses.

The following extracts from reports indicate the value of the effort:

"Are you going to join the sewing class?" they asked me. "Yes," I replied.

thought of it, but I suppose I'll have to learn sometime and this seems a good opportunity."

That was the spirit with which I enrolled in the class and attended my first lesson. There I was initiated into the various stitches used in sewing—how they were made and when they were used. I left the class in a disheartened mood. "Yes, you must always use your thimble," and "Don't you think you could hold your needle in a less awkward position," were remarks that had been addressed to me more than once during the evening. My first attempts at sewing were far from encouraging.

After the next lesson, however, my outlook became less gloomy. I had gotten my needle under control and was progressing fairly well with hand sewing. It was with regret that I learned that we must use the sewing machine on our kimonas. At first I broke the thread every few minutes, the wheel persisted in going backward instead of forward, and my seams were crooked. I was almost driven to distraction, but finally I became accustomed to the machine and things ran more smoothly. When, at last, I finished the kimona, I felt as if I had conquered kingdoms. It was then that I discovered that I really liked and enjoyed sewing. This made me very enthusiastic about the classes and I looked on Friday, our class day, as a gala day in the week.

It has helped me so much. Now I do all my own darning and patching and some sewing. I had only made one dress for my doll before my first work in the Club. I am so glad I had the chance to take this course, for I have learned so much about sewing I shall never forget.

During the winter there were several hockey matches to which I should have liked to have gone, but thought the sewing class more important.

I do not begrudge the time spent in our class and I am especially grateful to our leaders for all the trouble they went to for me.

I am very sorry that the class work has been completed as far as I am concerned, for I have taken the full course. My certificates are a source of pride to me.

I consider every minute I spent at the Club as being well worth while for I could not sew even a little before I joined. Since completing my club work I have succeeded in making for myself a dress having set-in sleeves, the waist being cut separately from the skirt, the latter being gathered on the waist.

Besides being able to sew, we had a good time together, as this is the only girls' club of any kind in our community.

We showed several of the articles at our District Annual and they received great praise.

It is really amazing to see the enthusiasm the girls show in the work of the Garment Club. The results achieved by the girls are wonderful. Some of the work would compare very favourably with that by older and more experienced sewers.

This Club Met in the School

Four ladies were first chosen from the Institute members who were good at plain sewing. Then we asked the teachers in the Continuation School to tell us how many of the girl students would care to take the Club work. Twenty girls entered the class. We began by meeting at our homes, but found that too much of the time was taken up in getting started, so decided to go to the school. We met one day each week at the school at 4 o'clock and gave them an hour. The girls were delighted. They never lost interest and one mother said it was

and failed. The Department sent a judge to examine the work and award the Certificates of Achievement in April, when we had tea served by the girls, some music, and a general good time. We enjoyed it more than anything we have done, and our twenty girls are looking forward to starting the second year's work at once.

What Another Club Did

A number of clubs have completed the second year's work. In one, fourteen of the girls received primary diplomas in 1925 for doing part of the work set down in the schedule. All but one completed the first year's work and received first-year certificates this year, 1926, and almost all are again eager to complete the work this coming winter. Last year another primary class was started, twenty-one receiving primary certificates. These were all very small girls, too young to do the work set down by the Department, so they made dolls' dresses, kimonas and nightgowns, made a button hole and sewed on a button, did the patches and the darns.

For each class there were two sewing guides, and the meetings were held on alternate Saturdays, with the work in connection with the First Aiders for two months. Then the sewing meetings were held oftener in order to get the work finished in time for the judges. A small fee of 10c was charged, which covered cost of needles, thread, darning yarn, etc. This was found to be very satisfactory, as suitable materials to work with were always on hand. It also made each girl a member, and each one possibly felt a little more responsible.

Girls' Household Science Judging Competition

Definite standards are being established among the girls of the rural districts in the choice of foods and their combination, and in the choice of clothing and suitable costumes for various occasions, through the holding of instruction classes followed by county judging competitions. The following outline indicates the ground covered in 1926:

Nutrition: School lunch, and a day's menu for a family in the country.

Baking: Bread and plain cake.

Good Dressing: Wardrobe suitable for girl in the country and Dress Parade.

Sewing: House dress and making buttonholes and plain hem.

Twenty-one counties took advantage of the services of instructors in judging the above classes. With the assistance of the agricultural representative and, in many cases the local W.I., groups of girls were given instruction in judging. This was followed by a county-wide competition in most counties, when county teams (three girls in each) were selected to compete in the intercounty competition held at the Canadian National Exhibition. There were twenty-one of these teams, and in addition 166 girls entered the open competition, altogether 229.

A great many girls who took advantage of the coaching in the various local centres did not enter the county competitions but, nevertheless, received valuable instruction.

In the intercounty competition the tema from Haldimand County won the trophy donated by the C.N.E. The members of the team were:

Miss Betty Elder, Cayuga, Ontario	743
Miss Elga Lint, R.R. No. 3, Cayuga, Ontario	742
Miss Frances Fearman, R.R. No. 3, Cayuga, Ontario	675

The contestants standing highest in the various classes in the team competition were:

Baking: Miss Mary Dunton, R.R. No. 6, Brampton........ 189
Nutrition: Miss Gladys Packham, R.R. No. 1, Caistor Centre........ 197
Sewing: Miss Kate Frizzell, Bognor........ 196
Good Dressing: Miss Elga Lint, R.R. No. 3, Cayuga........ 194

The girl receiving the highest aggregate mark in the team competition was:
Miss Betty Elder, Cayuga........ 743

In the open competition the high girls in the various classes were:
Baking: Miss Eva Graham, Simcoe........ 177
Nutrition: Miss Margaret Watson, Woodbridge........ 194
Sewing: Miss Alice Frizzell, Bognor........ 185
Good Dressing: Miss Jessie Brown, R.R. No. 2, Thorndale........ 188

Prizes: Ten prizes, from $10.00 down to $1.00, were given in each class in both the intercounty and open competition, while a handsome silver trophy was awarded to the winning team. A miniature of the trophy was given to each member of the winning team.

Girls' Conferences

In order that the girls who are carrying on so effectively in the Junior Institutes and others interested in problems of special concern to the country girls might have an opportunity of associating together, exchanging views as how best to carry on, and securing up-to-date information in the lighter forms of agriculture, and particularly the service available through the Agricultural College and the Department of Agriculture, a conference was held at MacDonald Institute, Ontario Agricultural College, Guelph, on May 5th, 6th and 7th, 1926, with 240 girls in attendance. The staff and students of MacDonald Institute arranged the programme, and the Institutes Branch co-operated in completing plans and advertising the conference.

The programme included inspection of the various departments of the college and instruction in poultry raising and beekeeping. One day was devoted to health matters and another to citizenship, with community singing, physical education, amateur plays, and entertainment interspersed.

A comparatively small number of girls from east of Toronto took advantage of the conference at Guelph; so a similar conference was held at Kemptville Agricultural School in October. The staff of the school co-operated with the Institutes Branch in planning and carrying out the programme. There were eighty-seven girls at this conference. These conferences did much to stimulate a keener interest and create more definite objectives on the part of the Junior Institutes.

Junior Institutes

There are now seventy Junior Institutes in the Province, a number having been organized during the year. The membership is made up of girls from 16-26 years of age. While the Juniors are organized on the same bases as the W.I., they stress features that are of special interest to the girls. The Junior Institutes and Junior Farmers' associations are co-operating in many counties, in social and educational efforts. Debates, dramatics, public speaking, musical competitions, sports and community work in general are receiving attention. The Junior Institutes are generally co-operating with the local Women's Institutes and are

contributing to hospitals, children's shelters and other worthy causes, and have sent supplies of clothing to many centres in Northern Ontario.

Summer Series of Meetings

In accordance with the custom which has been followed for over twenty years now, each Institute was given an opportunity to have a lecturer sent out by this Department attend a special meeting sometime during the latter part of May or in June. Over 700 branches took advantage of this service; in many districts two or three nearby branches held a union meeting. While the chief object of this series is to assist the officers and members in formulating plans which promise to make the work of the branch more successful, the speakers were prepared to give definite instruction along lines of practical value to the members. The subjects dealt with by the lecturers include various features of the food problem; health, largely from the preventive and educational standpoint; agriculture for women; patriotic topics; up-to-date methods in planning and carrying on the work of the household; co-operation; home crafts; neighbourliness in its broadest sense; home beautification; assistance to the schools; how to assist the boys and girls to find their right life-work; community activities; patriotism; gardening, and many other features of general interest.

Preceding the summer series, a conference of lecturers was held in order that they might exchange views as to how best to carry on and be fully informed as to the latest developments in the Institute field.

District Annual Meetings

These gatherings in ninety-six centres, with official representatives from the branches throughout the district, are devoted chiefly to the presentation of reports, election of officers, and the formulating of plans for district activities throughout the year. The members of the Provincial Board attend so far as possible the district meetings in their respective subdivisions, and the Institute's Branch furnishes special speakers for a considerable number of the annual gatherings. Representative women from all the branches, meeting in conference at the annual gathering, do much to stimulate a keener interest in the work and make plans for extending the work to new centres and giving assistance to those branches which feel the need of some encouragement and help from the district officers and the leaders in the stronger branches.

Annual Conventions

The ever-broadening field of activities and the growing importance of the work of the Institutes resulted in conventions being held in nine centres during the fall of 1926 as follows:

New Liskeard (Temiskaming)	Oct. 6, 7
Port Arthur and Fort William (Kenora, Rainy River and Thunder Bay)	Oct. 12, 13
Huntsville (Parry Sound and Muskoka)	Oct. 12, 13
Silver Water (Manitoulin)	Oct. 15
Soo (Algoma and St. Joseph Island)	Oct. 19, 20
Belleville (Hastings, Northumberland and Prince Edward)	Oct. 26, 27
Ottawa, Eastern Ontario	Nov. 2, 3, 4
London, Western Ontario	Nov. 9, 10, 11
Toronto, Central Ontario	Nov. 16, 17, 18

Convention committees representative of the area covered by each of the conventions co-operated with the Institute's Branch in planning programmes, making local arrangements for halls, billeting, etc., and in carrying out the programme. These annual gatherings are an important factor in stimulating a more general interest in the work and formulating plans for further activities.

The conventions in the fall of 1926 devoted a good deal of the time to outlining not only the work which was done, but details as to how to organize and carry on effectively. A representative from the Institute's Branch assisted at all the conventions. It was the unanimous opinion that the 1926 conventions were the most successful yet held.

The subdivision embracing Hastings, Northumberland and Prince Edward held its first convention at Belleville. A general committee representative of the six districts included in the subdivision was formed. Sub-committees were appointed for billeting, registration, publicity, decoration, music and entertainment, reception, exhibits, and banquet, and chairmen of standing committees were appointed to report at the convention.

A very interesting feature of this convention was exhibits of articles made by Girls' Garment-Making Clubs; hats made by the wearer within the past year; a collection of baking, two loaves of bread, six or more buns, twelve cookies, twelve tarts, twelve doughnuts (each Branch in the district was allowed to exhibit only one collection of baking); house dresses made by those who had taken a sewing course in a Women's Institute class; first aid kits which had been in use since the first of April, 1926; school lunches (one exhibit allowed from each Branch); institute programmes.

The businesslike manner in which the convention was organized and carried on reflects great credit on the capabilities of the women in the subdivision concerned.

While special mention is made of the Bellville convention, largely because of the splendid exhibits they had in connection with their convention, we are pleased to state that the convention committees in all the other areas co-operated effectively in making plans and carrying them through for their respective areas.

Distribution of Literature

The Women's Institutes receive much valuable information, and in some cases service, from other departments of the Government and other organizations. The Institutes Branch of the Department of Agriculture brings to the attention of the Institutes throughout the Province from time to time literature published by the various departments of the Government and of special interest to women. Copies of literature are sent to the officers of each branch, with a request that they bring same to the notice of the members at one of their meetings, informing them that they can get copies of the bulletins exhibited by writing to the department or organization concerned.

Geo. A. Putnam,
Superintendent,

ONTARIO WOMEN'S INSTITUTES, STATISTICAL STATEMENT, 1925-26

Institutes	Membership	No. of Meetings	Attendance	Papers and Addresses	Receipts					Expenditures								Balance for 1925-26
					Balance from 1924-25	Membership Fees	Grants	Miscellaneous	Total	Expenses for Meetings	Officers' Salaries and Expenses	Postal and Stationery	Printing and Advertising	Lectures' Expenses	Books and Periodicals	Miscellaneous	Total	
	No.	No.	No.	No.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Addington	113	42	693	10	312 21	41 75	94 00	486 55	934 51	8 90	54 02	10 17	13 93	6 25	20 65	508 50	622 42	312 09
Algoma, Centre	149	50	645	33	273 57	44 65	65 00	243 51	626 73	6 27	72 00	9 19	11 48	6 00	1 88	246 91	353 73	273 00
Algoma, East	158	70	921	29	330 15	42 75	58 00	1205 54	1636 44	99 95	97 45	12 49	18 02	4 00	3 47	938 74	1174 12	462 32
Algoma, North Sh.	145	53	767	28	151 11	42 35	34 00	835 99	1063 45	64 57	39 80	9 59	15 95	5 75	8 44	682 27	826 37	237 08
Amherst Island	52	13	265	11	59 68	13 00	25 00	70 85	168 53	6 50	24 00	2 77	......	2 50	2 25	113 75	151 77	16 76
Brant, North	618	151	4493	184	817 53	154 50	119 00	1731 70	2822 73	75 70	67 00	22 89	59 23	65	4 00	1961 46	2190 93	631 80
Brant, South	513	180	4022	127	703 32	108 25	80 00	2978 42	3869 99	35 89	103 50	34 74	73 71	3 50	12 16	2709 27	2972 77	897 22
Brockville	346	92	2274	68	596 65	86 25	77 00	1414 14	2174 04	72 72	34 50	13 46	42 57	1 35	5 15	1241 10	1410 85	763 19
Bruce, Centre	334	95	2061	98	1267 21	80 75	83 00	1602 57	3033 53	150 33	66 55	16 74	73 75	12 98	7 65	1845 09	2173 29	860 24
Bruce, North	421	128	2327	99	1046 51	106 25	105 50	1438 97	2697 23	69 75	46 70	19 98	33 95	10 50	26 77	1607 17	1814 82	882 41
Bruce, South	315	86	2301	122	848 48	78 75	77 00	1967 65	2971 88	23 74	65 05	14 94	48 70	9 50	9 20	1421 73	1592 86	1379 02
Bruce, West	317	104	3102	861	1536 88	70 25	127 00	908 58	2642 71	19 43	105 76	16 48	44 04	5 00	2 21	2021 14	2214 06	428 65
Carleton	731	202	3361	171	2023 48	179 50	124 00	2784 01	5110 99	69 26	92 25	37 40	61 87	11 95	103 50	2036 29	2412 52	2698 47
Dufferin	693	172	4226	149	1026 87	175 50	144 00	2270 37	3616 74	126 88	100 20	38 43	126 89	24 80	15 20	1988 81	2421 21	1195 53
Dundas	360	64	1535	59	1499 32	105 15	73 00	1524 81	3202 28	41 76	55 00	28 64	74 40	3 40	33 60	1803 75	2040 55	1161 73
Durham, East	365	77	1114	30	1555 11	80 50	83 00	1075 52	2794 13	26 50	36 00	20 69	47 77	25 95	1 95	1090 71	1249 57	1544 56
Durham, West	516	97	3268	86	451 53	129 00	83 00	1084 70	1748 23	41 00	71 50	17 66	38 76	8 45	50	1009 60	1187 47	560 76
Elgin, East	320	97	3054	87	821 61	77 25	123 83	1510 99	2533 68	103 25	106 94	46 36	54 75	25 22	20 26	1231 39	1588 17	945 51
Elgin, West	447	136	3491	176	3258 75	111 75	123 50	2634 31	6128 31	57 50	73 55	17 53	41 18	4 60	4 30	1998 62	2197 28	3931 03
Essex, North	157	47	843	17	347 10	39 25	40 00	368 56	794 91	5 85	30 68	3 74	17 25	3 65	3 00	441 22	505 39	289 52
Essex, South	621	82	2306	82	1384 05	156 75	277 50	2416 29	4234 59	24 00	103 35	18 96	102 85	2 00	22 77	2073 25	2347 18	1887 41
Frontenac	457	135	2453	56	1407 45	96 10	162 00	2006 93	3672 48	81 53	96 75	32 68	45 73	19 47	231 82	1813 78	2321 76	1350 72
Glengarry	130	67	1088	41	1128 13	32 50	4608	0014 66	2615 29	225 33	36 05	21 54	29 47	33 06	15 75	1004 33	1365 53	1249 76
Grenville, South	364	102	2046	65	1103 80	111 75	89 00	2706 71	4011 26	391 91	55 50	17 71	43 22	3 00	4 86	1959 61	2475 81	1535 45
Grey, Centre	484	151	2714	148	925 80	127 00	125 00	1587 06	2764 86	35 25	109 50	33 34	63 85	18 00	9 08	1911 54	2180 56	584 30
Grey, North	683	207	5299	220	607 88	175 30	143 00	1914 71	2840 89	83 31	113 50	34 04	94 09	35 65	......	1639 40	1999 99	840 90
Grey, South	434	130	3429	141	615 43	105 25	101 00	1542 73	2364 41	67 00	51 00	17 86	62 41	22 90	1 50	1424 99	1647 66	716 75
Haldimand	865	293	6197	362	1773 44	216 25	130 00	3779 49	5899 18	92 03	170 62	40 00	78 11	4 10	29 45	4010 48	4424 79	1474 39

Haliburton	122	28	622	46	198 85	30 50	59 20	649 08	937 43	7 00	37 00	9 23	4 75	7 50	......	440 09	505 57	431 86
Halton	534	108	2873	89	954 18	135 95	76 00	1590 17	2756 30	99 30	116 18	18 62	64 24	1 60	8 07	1644 01	1952 02	804 28
Hastings, East	150	57	1412	53	107 37	37 50	65 00	350 85	560 72	28 20	42 00	7 25	26 16	2 00	8 98	187 11	301 70	259 02
Hastings, North	507	144	2634	89	825 34	126 50	170 00	1227 25	2349 09	32 00	86 45	20 88	64 03	34 02	5 75	1450 85	1693 98	655 11
Hastings, West	146	54	934	22	375 76	35 00	65 00	653 97	1129 73	7 65	45 00	7 15	15 32	7 80	4 00	470 46	557 38	572 35
Huron, East	320	102	1732	84	487 37	72 75	58 00	1167 42	1785 54	101 89	69 82	21 06	55 60	5 52	11 15	859 39	1124 43	661 11
Huron, South	225	46	1208	38	233 94	56 25	81 00	698 56	1069 75	92 52	10 00	9 44	36 20	90	16 85	542 50	708 41	361 34
Huron, West	507	109	3216	119	1262 93	126 55	64 00	3162 04	4615 52	164 70	93 60	18 25	56 77	63 95	23 29	2579 38	2999 94	1615 58
Kenora	286	80	1450	46	738 31	100 00	46 00	2842 74	3727 05	102 47	58 65	18 44	37 90	11 35	1 90	2995 43	3226 14	500 91
Kent, East	233	93	1996	84	311 17	78 95	108 00	869 10	1367 22	16 50	140 64	9 87	48 82	2 50	15 70	601 39	835 42	531 80
Kent, West	300	86	1163	56	525 42	61 95	93 00	949 08	1629 43	17 61	73 87	9 26	60 14	5 37	8 70	854 92	1029 87	599 56
Lambton, East	503	161	3768	150	1877 28	121 00	218 00	1708 93	3925 21	48 88	126 00	25 95	60 20	9 75	14 66	1974 95	2260 39	1664 82
Lambton, West	444	156	3104	108	1340 32	103 40	169 00	1491 01	3103 75	35 75	149 90	28 34	43 17	21 50	47 60	2098 52	2424 76	678 95
Lanark, North	208	58	971	55	402 40	53 25	70 00	687 51	1213 16	12 50	38 00	10 81	27 75	......	2 80	505 59	597 51	615 65
Lanark, South	225	92	1397	42	677 90	56 25	88 00	1822 55	2044 70	99 13	71 15	20 32	54 57	18 29	10 52	1644 00	1917 96	726 74
Leeds, N. & Grenville	233	46	1979	37	563 85	58 25	65 00	1072 23	1759 35	45 00	26 05	10 85	22 25	9 77	3 63	1055 00	1172 61	586 72
Leeds, South	443	147	2460	135	1815 86	115 00	97 10	2066 19	4094 15	49 25	186 58	39 29	91 92	14 60	4 85	1924 31	2310 80	1783 35
Lennox	414	94	1953	36	297 40	102 50	181 00	416 94	997 89	31 60	63 95	16 97	39 04	13 35	22 85	367 63	555 39	442 50
Lincoln	745	147	4476	102	1005 37	184 00	147 00	1847 86	3184 25	142 92	190 65	37 87	63 40	4 25	1 50	2012 15	2452 74	731 49
Manitoulin, East	305	156	1894	184	517 91	69 25	64 00	797 87	1449 03	64 22	33 40	20 97	9 50	19 35	4 75	569 40	721 59	727 44
Manitoulin, West	120	68	983	59	216 78	27 00	55 40	504 83	804 01	67 40	55 75	7 28	4 95	5 00	6 60	457 03	603 01	201 00
Middlesex, East	490	113	3780	146	907 53	131 20	101 00	1916 32	3056 05	94 62	56 52	31 69	40 79	2 90	113 70	2034 15	2374 37	681 68
Middlesex, North	525	136	2658	85	493 95	123 25	76 00	1779 85	2473 03	49 02	59 00	26 31	21 75	2 00	54 90	1726 18	1939 16	533 87
Middlesex, West	322	106	2137	96	938 80	80 00	64 00	1312 23	2395 03	47 37	121 75	14 94	30 55	......	20 77	1439 69	1675 07	719 96
Muskoka, Centre	111	51	390	11	301 81	42 75	46 00	722 89	1113 45	16 53	33 00	13 81	4 00	5 00	9 70	653 12	735 16	378 29
Muskoka, North	214	109	1274	48	711 87	66 35	64 00	1376 42	2218 64	26 50	89 85	18 00	27 94	16 00	5 70	1395 10	1579 09	639 55
Muskoka, South	273	103	1359	18	597 04	68 00	64 00	1699 27	2428 31	8 50	64 50	19 78	18 99	11 95	9 29	1539 25	1672 26	756 05
Nipissing, East	42	22	355	15	1420 11	12 50	6 00	429 27	1867 88	......	......	3 60	4 80	3 75	12 50	926 99	951 64	916 24
Nipissing, West	17	10	45	....	83 45	4 25	3 00	11 04	101 74	......	......	78	1 50	1 52	14 92	45 00	63 72	38 02
Norfolk, North	358	230	2195	126	1078 37	89 85	81 65	1105 49	2355 36	120 31	76 50	23 20	176 17	12 56	27 36	1317 12	1753 28	602 08
Norfolk, South	343	95	1851	74	2268 68	102 99	65 00	1936 48	4373 15	25 00	103 20	21 28	73 02	5 00	54 60	2610 16	2892 20	1480 89
Northumberland, E.	161	79	2892	125	847 95	91 75	77 00	1003 88	2020 58	36 30	116 55	14 57	65 67	15 75	1 77	1209 77	1460 38	560 20
Northumberland, W.	229	96	2433	119	1064 09	57 25	83 00	980 28	2184 62	14 67	93 15	31 99	50 02	24 25	39 18	1046 69	1299 93	884 69
Ontario, North	189	68	1432	73	201 03	46 25	65 00	1174 94	1487 22	12 20	43 20	9 80	50 40	2 50	......	792 24	910 34	576 88
Ontario, South	326	105	3035	91	447 49	80 75	89 00	840 91	1458 15	76 77	91 00	14 39	28 91	50	21 27	573 39	806 23	651 92
Oxford, North	387	78	2486	92	699 67	83 52	119 00	1273 17	2175 36	115 28	45 02	16 01	51 73	8 00	50	1279 59	1516 13	659 23
Oxford, South	436	105	2579	105	1155 65	108 50	170 00	2473 28	3907 43	26 13	126 10	15 88	284 99	10 05	2 00	2169 13	2634 28	1273 15
Parry Sound, North	97	40	605	19	359 86	20 75	34 00	582 70	997 31	63 00	83 00	9 20	2 35	5 00	1 35	530 96	694 86	302 45
Parry Sound, South	148	49	825	16	398 02	61 15	52 00	2030 83	2542 00	62 50	63 00	19 82	45 82	46 80	11 25	1924 27	2173 46	368 54
Parry Sound, West	181	31	775	9	780 74	44 75	6 00	997 63	1829 12	146 50	......	2 78	27 25	6 55	5 50	259 32	447 90	1381 22
Peel	969	232	6236	286	1261 20	288 50	130 00	3015 40	4695 10	148 79	131 15	54 40	72 15	12 00	4 00	3307 56	3730 05	965 05
Perth, North	309	116	2417	105	482 69	89 55	70 00	1145 99	1788 23	67 80	93 95	16 31	54 90	4 25	29 84	1039 78	1306 83	481 40
Perth, South	374	117	2531	112	555 56	102 75	82 00	1570 38	2310 69	115 60	58 00	20 15	58 75	12 90	8 35	1372 45	1646 20	664 49
Peterborough, East	101	32	450	22	239 71	32 00	28 00	286 69	586 40	39 50	62 37	8 00	20 14	3 00	......	194 91	327 92	258 48
Prince Edward	541	144	2803	145	449 52	135 25	233 25	1727 83	2545 85	29 40	68 02	17 46	63 73	8 25	11 35	1859 70	2057 91	487 94

ONTARIO WOMEN'S INSTITUTES, STATISTICAL STATEMENT, 1925-26

Institutes	Membership	No. of Meetings	Attendance	Papers and Addresses	Receipts: Balance from 1924-25	Receipts: Membership Fees	Receipts: Grants	Receipts: Miscellaneous	Receipts: Total	Expenditures: Expenses for Meetings	Expenditures: Officers' Salaries and Expenses	Expenditures: Postal and Stationery	Expenditures: Printing and Advertising	Expenditures: Lecturers' Expenses	Expenditures: Books and Periodicals	Expenditures: Miscellaneous	Expenditures: Total	Balance for 1925-26
	No.	No.	No.	No.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Rainy River, Centre	176	87	1096	65	395 06	43 75	52 00	899 99	1390 80	33 77	39 50	15 56	9 57	17 50	10 35	832 12	958 37	432 43
Rainy River, East	158	66	526	27	451 99	45 30	40 00	1300 36	1837 65	171 00	51 70	30 65	23 25	1 00	......	1117 97	1395 57	442 08
Rainy River, West	156	67	888	32	993 33	33 75	74 75	2035 95	3137 78	91 75	28 70	11 53	14 25	8 20	12 00	2247 54	2413 97	723 81
Renfrew, North	279	86	626	81	1797 54	59 00	52 00	1411 50	3320 04	30 50	67 71	9 92	151 90	6 50	26 27	781 24	1074 04	2246 00
Renfrew, South	276	116	2201	92	772 86	65 75	87 00	844 24	1769 85	10 50	56 10	17 86	16 89	17 55	30	821 35	940 55	829 30
Simcoe, Centre	321	105	2369	110	485 51	79 00	86 00	1879 14	2529 65	53 00	78 45	14 63	7 01	9 50	2 10	1953 55	2118 24	411 41
Simcoe, East	752	271	5796	175	1141 11	185 00	190 00	3144 05	4660 16	98 53	152 40	58 03	69 45	18 48	13 85	3003 71	3414 45	1245 71
Simcoe, South	519	175	3803	159	640 80	137 65	125 00	2713 76	3617 21	179 17	46 35	45 11	92 64	18 85	77 43	2408 45	2868 00	749 21
Simcoe, West	243	121	1869	78	792 05	61 00	101 00	1742 08	2696 13	46 00	286 66	25 00	36 68	18 55	321 06	1268 53	2002 48	693 65
Stormont	310	104	2871	65	1254 78	74 00	128 00	2232 45	3689 23	55 50	53 40	21 71	11 88	60 85	24 85	1714 27	1942 46	1746 77
St. Joseph Island	56	45	325	13	556 04	26 00	34 00	883 96	1500 00	17 50	31 00	5 57	4 10	3 00	......	620 77	681 94	818 06
Temiskaming	583	213	2507	53	852 82	152 75	181 92	4594 58	5782 07	315 67	171 05	65 54	17 38	31 50	39 83	4094 89	4735 86	1046 21
Thunder Bay	477	196	3232	137	1530 65	95 75	91 00	2322 80	4040 20	183 52	190 55	52 23	55 38	20 50	24 60	2256 22	2783 00	1257 20
Union	95	41	811	43	227 36	24 25	34 00	287 90	573 57	17 45	32 00	7 11	7 10	2 00	......	255 75	321 41	252 10
Victoria, East	282	90	1801	77	369 42	69 00	83 00	649 29	1170 71	15 50	43 65	20 24	24 30	5 70	......	691 49	800 88	369 83
Victoria, West	501	140	3488	116	876 24	115 45	107 00	2784 10	3882 79	122 28	96 05	24 36	73 25	9 05	31 20	2015 67	2371 86	1510 93
Waterloo, North	119	44	873	15	86 39	29 75	69 00	290 84	475 98	24 98	57 00	6 38	22 35	1 50	6 81	159 64	278 66	197 32
Waterloo, South	501	109	2943	102	1702 48	124 25	99 00	3119 95	5045 68	102 25	137 15	21 45	107 02	23 38	11 64	2805 45	3208 34	1837 34
Welland	886	195	4221	133	2630 06	199 45	461 71	5670 01	8961 23	669 32	222 05	39 83	124 42	19 10	9 75	4464 90	5549 37	3411 86
Wellington, Centre	335	111	2904	96	473 98	93 80	74 00	1606 46	2248 24	16 00	14 55	60 35	47 00	4 60	16 46	1493 80	1652 76	595 48
Wellington, East	164	43	1258	11	439 48	40 00	37 00	616 95	1133 43	30 60	30 00	7 42	17 60	......	7 45	448 62	541 69	591 74
Wellington, South	371	118	3202	152	340 03	111 75	80 00	1007 63	1539 41	38 84	133 87	21 66	20 68	19 04	......	888 31	1122 40	417 01
Wellington, West	313	48	1620	51	566 32	78 25	44 00	1234 88	1923 45	45 55	69 15	10 38	46 30	13 83	8 26	740 55	934 02	989 43
Wentworth, North	660	159	4107	166	991 04	174 50	150 00	1725 05	3040 59	81 71	120 00	21 24	95 35	3 40	18 80	1623 07	1963 57	1077 02
Wentworth, South	799	162	4929	171	913 80	167 00	191 00	2653 46	3925 26	91 35	210 61	42 35	99 65	6 30	53 50	2611 28	3115 04	810 22
York, East	489	106	3426	98	1199 72	160 55	105 00	2241 88	3707 15	233 26	131 25	21 59	65 14	15 15	7 00	1856 83	2330 22	1376 93
York, North	482	103	2795	101	787 61	110 00	90 00	1684 15	2671 76	42 60	108 64	18 08	51 78	12 75	85	1623 04	1857 74	814 02
York, West	455	122	3322	118	340 93	105 00	132 00	3266 06	3843 99	53 89	62 50	11 86	75 41	5 50	3 50	3110 91	3323 57	520 42
					$	$	$	$	$	$	$	$	$	$	$	$	$	$
Total	35,979	10,665	229,612	9,631	83,963	9,166	9,660	158,313	261,102	7,587	8,194	2,110	4,969	1,165	2,013	147,126	173,164	87,938

THE REPORTS OF STANDING COMMITTEES AS PRESENTED AT THE W.I. CONVENTIONS IN THE FALL OF 1926

EDUCATION AND BETTER SCHOOLS

Miss K. F. McIntosh, Brampton, Ontario,
Provincial Convener

We wish to refer you to the activities which can be classified under this committee as outlined in the 1925 report under the headings of The School, The School Grounds, The Pupils, The Community.

We believe that every Institute is doing something of an educational value and would welcome fuller reports on their activities. The new Hand Book is an excellent source of suggestion for study.

May we draw your attention to the new Canadian History Readers just issued? Eight of these on "How Canada Grew Up" may be procured at a price of $6.25.

University Extension Service has been taken advantage of by a number of the Institutes. Particulars as to the conditions upon which the lecturers will be furnished and the subjects they will deal with, together with the subjects in which courses of instruction willl be given, may be secured by writing to the following persons: Mr. W. J. Dunlop, University Extension Department, University of Toronto, Toronto; Mr. A. H. Carr, Director of Extension Courses, Queen's University, Kingston; Mr. W. J. Brown, Director of Extension Courses, Western University, London. The Correspondence Courses cover English, History, Modern Invention, Canadian Literature, Motor Mechanics, Woodcraft, Manual Training, etc.

To those who wish to take Correspondence Courses, where University Extension classes cannot be carried on, may we suggest, first, writing to the Department of Extension at any of the above-named universities, asking for their suggestions for study; second, the Canadian Chautauqua Reading Circle Series; third, reading of the Master Works of Canadian Authors, Radisson Edition, which is being placed in all the public libraries.

The Federated Women's Institutes' demonstrations and exhibits at the Canadian National Exhibition are described as the most national thing at the Exhibition. The Junior Judging Contests, both county and Canadian National Exhibition, which cover the problems of foods, clothing, and the home, are of great educational value.

The offering by Women's Institutes of scholarships of three months' courses at MacDonald Institute, Guelph, as prizes for contests for general proficiency in the three months' short courses put on in the various counties; trips to Chicago to attend the 4-H Congress; the procuring of a supply of bulletins and an occasional speaker from the Canadian Social Hygiene Council, Hygeia House, Elm Street, Toronto, are recommended.

We would urge the further acceptance of Extension education as procurable through demonstration lecture courses, and Garment-Making Clubs; bulletins issued by the Departments of Agriculture, Education, and Health.

From among the many activities reported may we emphasize the value of a few. The appointment of a school visiting committee; the preparation of a school questionnaire which would give the number of schools having the hot lunch and the teaching of sewing and agriculture, and the forwarding of this report to the Provincial Convener of the Committee on Education and Better

Schools; County Health Week; replenishing of First Aid Kits; Hot School Lunch equipment and supplies; reception by the community to the teachers; beautifying school grounds and furnishing the teachers' rooms; provision of prizes for oratorical, public speaking, and debating contests; the offering of prizes for championship medals at school fairs; also prizes for health posters, first aid and other contests.

Report by Mrs. S. Shrier, Arkona, Convener for Western Ontario

The Institutes of Western Ontario are carrying out the programme outlined in the last annual report of the Provincial Chairman of Education. Home and School Committees have made possible many improvements in the buildings and many helps to sanitation and ventilation, thus making both scholars and teachers happier. Pianos, victrolas, and lights have been placed in several schools. School grounds have been improved, flowers, shrubs, and trees planted, also swings and teeter boards installed. Prizes were given for general proficiency, donations to the school library, and school fairs helped to success by the Institutes. Many branches have organized groups to put on debates, plays, and musical contests. School field days were also helped. While intensely interested in the welfare of the schools and the young people, our members do not neglect their own education. For that reason the programmes of the meetings usually contain something educational—papers on current topics of interest, study of new laws, discussion of proposed legislation. Some programmes show great interest in the study of our own and other lands.

About two years ago one of the leading American weeklies gave a moral code for school children which was intended to impress on the child's mind the way to become a happy, useful citizen. The final precept is worthy of quotation: "I must do all these things because I am accountable to God and to humanity for how I live and how I help my fellows, and for the extent to which they may trust me." If our education teaches our children to live up to that code there will be no need to worry over the future of our country.

A number of Institutes sent members to the Girls' Conference. Several also had social evenings for the scholars, teachers, and school board. A Book of Knowledge placed in the school, an oratorical contest, a furnished teachers' room, bubblers in the schools, playground equipment, hot lunch supplies, and prizes for essays on Canada indicate the helpful nature of school assistance. Members on the School Board, prizes for regular attendance and punctuality, and an "At Home" to get acquainted with a new teacher are others.

Report by Mrs. J. R. Brown, of Bonarlaw, Convener for Eastern Ontario

I was delighed with the wonderful work some of our Institutes are doing. Certain lines of activites have become fairly general, such as supplies for schools: first aid kits, drinking fountains, towels, vitrolas, bookcases, pictures, books; aiding school fairs, planting shrubs, but there are other interesting activities.

One of these is the musical training given in schools. One branch gained the consent of the School Board to commence this work, charging the small fee of 5c. per week, thereby making it partially self-supporting. After a concert given by the pupils under the auspices of the Women's Institute, the Board decided to put music down as part of the curriculum. They had an attendance of from 87 to 97, and the principal said the pupils looked forward to the lesson as a change and recreation. Several conduct a choral class once a year and

have music taught in their schools by a competent instructor, bought pianos, and secured a teacher to coach the children. One gives a teacher $25.00 for three months; another, a teacher at $250.00 a year. They raise their money by having thimble teas, valentine socials, carnivals, plays, autograph quilts, and several donations. A Glee Club was formed under the supervision of the instructor, meeting once a week. In some places this met with such approval that after the term expired for which the Women's Institues was responsible, the School Board carried on the work. When we realize the influence that good music has on a child and in the home, we know that the time and money is well spent.

Another gave $50.00 for a manual training outfit for the school, as the teacher was qualified. Another sent in fifty applications and a manual training teacher was sent out from one of the Toronto schools. The Women's Institute provided work benches at a cost of $5.00 each, and each boy was to provide the materials he used and his own tools. Bookcases, radio cabinets, and tables of all sorts were made. At the end of a three months' course a member of the Board of Education was sent out to inspect the work. Two of the boys were asked to demonstrate at the Exhibition the making of play equipment. The cost of the class was $153.00. The Government grant coyered $114.75, and the Institute paid the balance. Since the class, the boys have been making shelves, tables, and cupboards for their mothers.

Another branch bought a moving-picture machine five years ago, and the council gave them the free use of the Opera House. They put on a mixed programme of history, agriculture, and comedy, and last year the machine netted them $500.00. Judging from the reports by the branches this is a good money-making scheme and it also gives the Women's Institute an opportunity to put on educational programmes. A director of the Ontario Horticultural Society gave a talk on horticulture at one of the meetings. He suggested a township organization. A public meeting was called and an illustrated lecture given on flowers. In the spring they organized with a membership of seventy. Both last year and this they have held a flower show, and seem well pleased with the result. The Women's Institute donated $5.00 towards the prizes. Field days at which games of all kinds are participated in create a broader and kinder community spirit. A banquet was tendered to the Junior Farmers' and Girls' Judging Competition. Money for a trip to Chicago was donated to the girl who stood highest in general proficiency. A judging competition was organized by a branch at which two of the girls won prizes and one was asked to judge at the Exhibition, and won a $5.00 prize. The same branch reported a motor mechanics' class. The expense was met by the members of the class and the Women's Institute gave prizes.

A western branch gave prizes to children under 14 years of age for darned stockings and doll dresses and to boys for bird houses. Now a word on play equipment. Cash towards swings and teeters, croquet and baseball outfits was given to schools, also benches and long tables to accommodate tourists. Glasses were provided for a boy who otherwise might have been blind in six months. One Institute arranged for a Continuation School, using the village hall and putting in seats, desks, blackboard and bookcases. Another paid the expenses of a girl at college for two years. Others sent a delegate to the Girls' Conference at Guelph.

A great many are making use of the travelling library or contributing towards community libraries or entirely financing one. One compiled and published a calendar which they sell at 50c. each. It contains an honour roll of all from the township who made the great sacrifice during the late war, also a list of all who

served. On it are some pictures of some of the public and historical buildings with a description of each along with bits of local history. The rest of the calendar has names and quotations of residents and former residents, one for each day of the year. Twelve ladies were chosen, one for each month, to canvass for names and quotations at 25c. each. This provided funds, and by consulting old residents and records the material was arranged and typed and now each has a very interesting memento of the township.

Regarding the Home and School Committee, one secretary said in her report: "We never realized how dingy and neglected the school room was until we met there at a picnic, and then the Board, with adequate funds, asked the women to make out an itemized list of what might be done, and after a thorough cleaning and redecorating it became a place of beauty. The Inspector at the Belleville Convention said he hoped the women would visit the schools, as in his fifteen years of teaching only one woman has asked about her boys. The Home and School Committee is one of the most useful means for bringing the Institute and the school into helpful co-operation.

ADDITIONAL NOTES BEARING UPON THE SCHOOL

Good Water for the School

We raised a sum of money by a play which was staged in the community, and bought four school filters for the four schools represented in the Institute. The cost of those filters was $27.00 and they have been a boon to the school children by providing clean, sanitary water for drinking.

The Hot School Lunch

The Institute gave $5.00 to each of two schools in aid of the hot winter lunch. The teacher bought such things as rice, sago, barley, cocoa, sugar and made out a list of the cooks and dishwashers, taking two different pupils, boy and girl, every day. The cooking was done on an ordinary box stove. Cups and saucers brought from the homes are kept with saucepans and cooking utensils stored in a cupboard when not in use. The pupils select one day what they want for the next. If it is vegetable soup, the teacher asks "who can bring a soup bone?" and, of course, someone offers, the others bring the vegetables. Hash follows the next day. Beans are cooked at home and heated at school. Cocoa, tomato soup, escolloped corn, rice pudding, scrambled eggs, one hot dish a day, follow and are much enjoyed. This is a farming community where supplies are plentiful and generously contributed, the $5.00 contribution being ample for other requirements.

Milk for School Children

The school nurse reported to the Institute officers that some of the children, whose fathers were out of work, were very much undernourished. Funds were voted to supply a drink of milk at the first recess. For those unable to pay for them free tickets were furnished by the teacher in such a way that the other children did not know who were getting them, thus avoiding any feeling of embarrassment.

The milkman called on the way home from his morning route at each of the three schools, received his order, and had the milk there, put up in half-pint

bottles at three cents each, ready for the morning recess. This the children drank with relish through straws. The nurse reported all much benefited by it.

How Another Institute Supplies Milk

The very first thing was to get the consent of the School Board and then we appointed three members from the Institute to meet the Board of Education and place our plans before them. They were quite willing for us to supply the milk. The Board paid for the straws and the W.I. for the milk. The next step was to have the health officer, with the assistance of the district health nurse, weigh and measure the children, which they did and prepared a chart according to age and measurements of each child. Each teacher was given a chart, and the standard we were guided by was to give milk to all children five pounds under weight, and to any other pupil wishing to use the milk that was able to pay for it. Last winter we served milk to over 100 pupils. About fifty of these paid for their own milk. The children were served a half pint at morning recess, each teacher seeing that the children entitled to the milk received it. The teachers also collected the money from the paying pupils and with a report passed it over to the principal. He in turn, with a report of money collected and the amount ofmilk used, sent a report to the treasurer of our Institute. She then made out a cheque to the Board of Education and their secretary passed it on to the dairy supplying the milk. The milk was supplied from an accredited herd on the outskirts of the town, and was delivered at the school sometime between 9 and 10.45 a.m.

The money was raised in various ways from sales of home-baking, teas, and social evenings held at the homes of the members. We served the milk from early in November to the 1st of April. The pupils were again weighed and measured to see if any gain had been made, and the health officer said it had done good. Many of the mothers said the novelty of the straw induced the children to use the milk in school when they refused it at home.

An Oratorical Contest

Under Institute auspices ten pupils from four school sections entered a competition in recitation and public speaking. In the former a boy came first, a girl second, while in the latter the reverse resulted. The members were gratified with the ability and training shown by all who entered, the encouragement of which was the primary object of the competition.

Where the Dullest Has as Good a Chance as the Brightest

One Eastern Ontario Institute put on a most judicious school contest, offering two prizes to the two students who should make the highest standing according to the teacher's estimate under the heads:

1. Regularity of attendance.
2. Punctuality.
3. General cleanliness and neatness.
4. Well-cared for hair, finger nails, and teeth.
5. Clean face and hands.

The teacher's summing up stated that the contest had been a wonderful stimulus to the whole school thoughout the year.

Next year the Institute proposes to repeat it, providing separate contests for the boys and the girls for as one of the boys confided to his mother, "Boys stand no show against girls in a contest like that."

"HOME ECONOMICS"

Mrs. W. F. Ross, Embro, Ontario

The work along the line of Home Economics is so far reaching in its scope and so practical in its nature that no Institute which is doing effective work can fail to do something worthwhile along this particular line. As I said last year, it embodies the very ideals for which the Institutes were originally organized.

When Home Economics Schools were first opened they emphasized work along three particular lines, namely: food, clothing, and shelter, and for the present, at least, we will do well to adhere to this outline, for when we set out to make a study of these three phases of work we find them sufficiently broad to demand most of our time.

The topic of foods knows no boundary line. It is more interesting to-day than ever before. It is demanding the study of our leading doctors and nurses. When we know that certain diseases can be treated by diet alone, that an infant lives and grows on milk alone, we begin to realize something of its importance. Never belittle the Institute that is devoting some time at each meeting to this particular subject.

In fact the Institute that neglects to give special attention to the feeding of the pre-school age child, and the school lunch, is missing a golden opportunity for service in its community.

Why not co-operate with your Committee on Health and hold a Child Welfare Day? Let the Home Economics Committee see that samples of diet for various ages are prepared, that food charts are conspicuously placed, that school lunches are demonstrated, and that somebody—an authority on foods—gives an address upon milk, its value, its care, and its dangers.

This work is being very splendidly carried on in the cities by Home and School Clubs. Let the Home Economics Committee within the Institutes in the rural parts shoulder the responsibility, because according to medical inspection reports rural children are suffering from malnutrition from lack of milk in the diet.

Every Institute should see that books on nutrition are available to its members. Every member should have a copy of our Dominion Blue Books by Dr. MacMurchy, which are free for the asking through the Federal Department of Health at Ottawa. Then there are some splendid pamphlets issued by our own Provincial Department of Health and by Miss Chapman, on Feeding the Family, Canning of Fruits and Vegetables, etc. These are all free and every member should have a copy.

For a loan library within our Institute we would do well to have and study "Feeding the Family" by Mary Swartz Rose; "The Normal Child" by Dr. Allan Brown; "Housewifery" by Balderson, and every Institute should see that a short course in Domestic Science is made available for every girl in the community. It may be one of those Three Months' Courses with Domestic Science, Home Nursing, Sewing, or Millinery. Why not let the Institutes within the district co-operate and offer a prize or a scholarship in the form of a more advanced course at MacDonald Institure to the girls taking the highest standing?

Passing on to the subject of clothing. Let every Institute take advantage of a short course in sewing, or if there are a number of young girls, the Girls' Garment-Making Club courses, of which Miss Chapman has told us.

Some Institutes are studying the subject of clothing and dress—its relation to health, its relation to character. The study of textiles, the cost of various

materials, bargains in clothing (when and why). These are very timely subjects and should be on every programme.

Under the heading of shelter: Valuable time might be spent studying such subjects as the location of a house, plans for a new house, remodelling the old house, the efficient kitchen, a good heating and water system throughout the house, care of floors, essentials in home decoration. Indeed an almost endless variety of subjects for study along this particular line is at our hands. Under all three headings one subject which we should not overlook is that of "account keeping." Let various members submit a budget for the average farm home income. I find as I look over the work of the various provinces that practically all of them are urging the buying of "Canadian-Made Goods," standing behind our own producers and manufacturers; making a study of the high cost of various articles; who gets the excess profit and how to remedy it.

Last year I asked that each branch appoint a Home Economics convener, whose duty it would be to see that some phase of the work be taken up at each meeting; that a Home Economics Question Box be established in the Institute, and that the members be encouraged to pass on their knowledge and experience for the benefit of other members.

Let us not forget that the work of the Home Economics Committee is after all of prime importance. It is that which most vitally affects the home and community.

HEALTH AND CHILD WELFARE

DR. MARGARET PATTERSON, CONVENER, 97 WALMER ROAD, TORONTO

Never before have so many and so encouraging reports been received from all parts of the province. The interest in Health and Child Welfare has been universal. The activities have been many and varied but always practical and suited to the locality. A splendid spirit of co-operation has been established between the local Medical Officers of Health, School or District Nurses and organizations working along health lines.

The providing of first aid kits for schools, milk for underweight school children, hot school lunches and community emergency kits for children; securing medical attention for children, the distribution of health literature, the systematic study of health literature, conducting baby contests and assisting in procuring permanent nurses are a few of the many and varied activites of the Branches. One branch reported as follows: "Our Layette Basket was the outstanding feature. This basket contains a full layette for a new baby, also night gowns for the mother, sheets, pillow cases, blankets, spreads, bath towels, hand towels, draw sheets, rubber sheet, sterile pads for patients, hot water bottle, douche, bed pan. Such articles as olive oil, vaseline, safety pins, powder, absorbent cotton, toilet sap are renewed for each case. The basket complete may be had by any needy family, making application, for a period of three to six weeks. The only stipulation we make is that the articles returned must be clean. Also any family in every straightened circumstances may have a nurse to accompany the basket. We are most fortunate in having the co-operation of the hospital where the entire outfit is sterilized between each using." A basket like this would surely be most helpful in every community, being careful, of course, to see that it is thoroughly sterilized between each using; doubtless this could be arranged for at the nearest hospital.

Your convener was pleased that so many of the Branch Institutes devoted one meeting to a study of Health and Child Welfare, and enlisted the interest and help of the local doctors and nurses, as well as getting literature from the Provincial and Federal Departments of Health for distribution at this meeting. We are not making as much use as we should of the valuable publications offered us for the asking. Do you know that our Provincial Department of Health has a very complete section on prevention of communicable diseases? Any branch wishing suggestions or help for a health day or a health week should write to the Provincial Department of Health, Parliament Buildings, Toronto. Let them know what you want and they will help you.

There is no longer any question about the necessity for medical inspection of schools, but I fear that the benefits to a community of a district or school nurse have not yet been fully realized. While one medical inspection a year is most desirable it is not enough and there should also be a quarterly or monthly inspection by a nurse. If a child is sickly or underweight, the nurse should visit the home and consult with the mother in regard to the diet and habits, epecially the rest and sleep habits of the child in order to regulate them. Mothers are only too willing to co-operate with the nurse when they understand why things should be done. I cannot but feel that there is not a nurse in your district because you have not learned to make use of her as the men do the agricultural representatives. The nurse is there to be consulted about the health of yourself and family, so that in addition to her inspection of the schools, the mothers should ask her to their homes for consultation.

The proper time to begin the care of a child's health is before it is born. The health and success of your child for life may be largely determined by the prenatal care of the mother. When a woman realizes that God is going to give her his best gift, a child, let her take the nurse in confidence and be guided in the necessary prenatal care. A mother's ability to nurse her baby depends to a large extent on the care and diet during pregnancy. The nurse who is consulted by mothers in this way is interested in the whole family and will give valuable advice about any remediable defects in children during the pre-school years. Make use of your nurse and see if your community can afford not to have her?

It is true that we belong to the "Banner Province," and while we might "count our blessings" we must not be satisfied until we have given to every child the opportunity to be as healthy as knowledge can make it. That our Province has realized the value of conserving child life is shown by the acts passed in recent years, as we not only have laws to prevent the exploitation of children but many that are positively child welfare acts. We have the Children's Protection Act with an officer and a shelter in every county and a head office in Toronto with a large staff where over a hundred letters are answered daily. If any child is being cruelly treated report the matter at once to Mr. J. J. Kelso, Children's Aid Office, Toronto, and the matter will receive immediate attention. All complaints are investigated quickly and thoroughly.

In the more important legislation of recent years is the Mothers' Allowance Act, which is taking care of nearly 14,000 children and ensuring for them that which is the right of every child, to grow up in its own home under its mother's care. During the provincial fiscal year, which ended on October 31st, 1926, the amount disbursed in Mothers' Allowances throughout the Province totalled $1,886,045; this sum was received by 4,412 mothers with 13,085 dependent children in their care. The Workman's Compensation Act is also a child welfare measure, as it is paying thousands of dollars every day to keep home conditions normal while the breadwinner is incapacitated.

In addition, there is the act for the care of children of unmarried parents, the improved Adoption Act, the Child Placing Agencies and the Council of Child Welfare.

Let me again remind you that the Rotary Club is trying to look after any crippled child whose parents are not in a position to do so. Should you hear of such a child report the matter to the secretary of the nearest Rotary Club and they will assist you.

The Social Hygiene Council is ready to help us whenever possible and they would be glad to have you write to Hygiea Hall, 40 Elm Street, Toronto, for literature or advice.

In closing let me urge that you have at least one meeting devoted to Health and Child Welfare; better still, try for a Health Week in your district and ask the Department of Health to help you to organize it and arrange a Health Exhibit. The Provincial Health Department will send you all material for this and also the beautiful film "The Gift of Life." The more use we make of the things offered us the more will be made available for our use.

Let me again assure you that your convener is always pleased to be consulted and to be of any service to you. Let us take heart from what we have accomplished and press on to greater things, remembering that in raising the standard of health and child welfare we are laying the foundations of true nationhood.

AGRICULTURE

MRS. H. M. AITKEN, BEETON, CONVENER

There are two primitive emotions which actuate most of us in our struggle with life—love of the land, and love of gold, and it is owing to these two factors that we have industrial and agricultural life. Agriculture cannot dissociate itself from industry because industry is the logical market for the things which we produce. And, therefore, in considering the agricultural work done by Institutes we must also consider what affect this work has on urban population. We have always realized that the prosperity of our country is tied up to the products of the land—the good crops and fair prices for these crops mean a year of prosperity for Canada. But what we have failed to realize is the very important fact that women play in obtaining this prosperity. Farming, more than any other industry or occupation, is a partnership, a partnership of work, of interest, and of intelligence. More and more we are realizing that to this partnership we can contribute, not only actual work, but inspiration and ideals that will do a great deal to help our country.

The poultry industry of Canada is becoming one of our most important industries. Ten years ago the sale bill of any farm would specify in detail all the animals to be sold, all the implements and their various trade names, and then at the bottom of the bill we would find in very small print "also fifty or sixty old hens." That day has changed, for poultry and poultry products constitute one of our best sources of revenue. The annual financial report on the agricultural situation in Canada, as issued by Dunns, contains the following information: that during the past year every agricultural export has increased except eggs. The report then goes on to tell that the increased consumption of eggs in Canada has absorbed the eggs which formerly we exported and that this increase is due to the very high quality of the eggs which we are producing. And how have our women contributed to this result?

Throughout Ontario the Women's Institutes have been holding poultry culling demonstrations which are arranged through the Department of Agriculture. One woman will offer her home and her flock for the meeting and the agricultural representative or a member of the O.A.C. staff will cull the birds and will explain as he does so how non-productive hens may be picked out. In Manitoulin Island last summer a poultry culling campaign was put on and 3,000 non-productive hens were shipped out. That meant that the feed for 3,000 birds was being wasted, and not only was that expense cut out, but the birds netted the women about 22c. per pound, live weight. This service is available for any Institute or for any group of women and is a very valuable service indeed. We talk a great deal of the spread in price between the producer and the consumer, but the fact remains that good poultry products—fresh eggs, well-fleshed roasting chickens, and canned chicken—always have and always will bring good prices.

One of the most interesting lines of work that our women are going into now is the care of the enormous tourists' trade which we have during the summer. Most of these people prefer staying outside a city at night, and the woman who can provide comfortable, clean bedrooms and good food for these summer visitors has a very excellent proposition. Along the highway we have hundreds of homes thrown open to tourists. Of these less than fifty per cent. are actually making money on their investment. And why? Because these people are not giving value for the money received. To quote our salesmen, "there are no repeat orders." The women who are making money are managing places where the beds are clean, where comforts are provided for these travellers, and above all they are women who have a genius for hospitality. One of the most delightful places on the highway is an old brick farm house surrounded with apple trees. A brick path leads up to the front door. Inside the rooms are spacious, and cool, and not cluttered. The problem of laundry has been reduced to a minimum, the tables are painted gray with yellow linen runners. This place is filled all the time and is making a splendid profit which in turn is sending two small daughters to high school. Another profitable enterprise is candy making, Another is the selling of salad dressing, and canned chicken. At one wayside market the two girls who manage it sell approximately 150 jars of canned chicken and 100 jars of salad dressing during the week. The canned chicken disposes of the "slacker" hen and the salad dressing absorbs all the cream and the small eggs produced on the farm.

Small fruit farming is another industry in Ontario that is interesting more and more women, and it presents a problem that our Women's Institutes must tackle. You all know how the importation of American-grown fruits and vegetables takes the "edge" of the Canadian market. Of course, owing to our climate we cannot hope to produce early fruits and vegetables, but it is discouraging to have car loads of imported asparagus and strawberries and melons dumped in the Canadian market just as our fresh supply is coming in. In June of this year we paid the United States $349,140 for strawberries alone, $93,400 for melons, $47,872 for apples. No person could advocate the exclusion of American fruits and vegetables, but, what in your opinion would be the value of a seasonal tariff so that our own growers might be protected? This outstanding fact remains that in the last ten years 85,000 people who owned or were employed in market garden farms have quit.

In connection with small fruits we have several new varieties of raspberries, of currents, and strawberries. Did it ever occur to you that our Women's Institutes might run experimental crops in these new fruits and so popularize something that would be of value to the community? In Simcoe County an

attempt is being made to have experimental seed grain plots at the rural schools. The men, as well as the boys, are interested in these seed crops. At one of the school gardens where the new Garnet wheat was tried out, the yield was 84 bushels to the acre. Compare this with the average yield for Canada which is 17 bushels to the acre, to Ontario, which is 22 bushels to the acre, and it is easy to see how inspirational this work may be.

And so we might go on indefinitely because there is no limit to the possibilities of our work. And it is not woman's work nor is it man's work, but it is the work of every citizen for the development, for the prosperity, and the spiritual well-being of this Canada of ours.

Report from Mrs. R. H. Grant, Hazeldean,

Convener for Eastern Ontario

Our reports this year review activities along many lines, and progress in agriculture has been materially aided by the Women's Institutes. Their interest, particularly, has been directed to (1) School Fairs and Gardens, (2) Beautifying of Community Grounds, (3) Poultry.

Co-operation on the part of the Women's Institute is not lacking in the work of the school fair, and success is much due to the work of the organization. Many school gardens present a most creditable showing. Children are always pleased when their parents' interest is with them, and pride in their flowers and vegetables should always be encouraged.

Many reports indicate work done in the cleaning-up and care of neglected spots. Horticultural Societies have been formed in several places, and planting of spring bulbs and summer flowers has resulted in much improvement and beauty in both home and community, and exchange of bulbs and seeds has been greatly fostered.

In one centre the grounds surrounding a war memorial were an eyesore to the neighbourhood. The Women's Institute undertook the task of improving them, and by means of grass and flowers have made it an object of pride to the village. This is but one instance of the "housecleaning" needed in many places. There are many weed-grown village lots and neglected cemeteries demanding similar attention.

We have reports this year on the increased interest shown in the raising of poultry. Some Institutes report demonstrations held in killing and plucking of fowls, in dissecting of, and reasons for diseased fowl. Culling demonstrations have been most successful both in interest and attendance, many members now being able to cull their own flocks. This interest, evinced in improved flocks, it is hoped and expected will continue, helped by the influence of the organization.

It is very evident whether it be cooking or poultry, horticulture or dairying, woman's desire to succeed has been the road to success. In the many phases of agriculture, each year bringing new ones to use, may we not only succeed but prosper.

Report from Mrs. J. W. Macfie, Appin, Ontario

Covener for Western Ontario

The study of birds, insects and trees among Essex Institutes has been very popular. She says: "In England a man who owns his farm is considered landed gentry and respected as the main stay of his country." The farmer is God's

partner in giving to the world the food it must have. So let us, as Women's Institute members, boost our business as farmers' wives and our community more than ever before, and we will be doing a wonderful work for agriculture.

INSTITUTE EXHIBIT AT COUNTRY FAIR

At our district meeting a member of the Board of Management of the Fair solicited the co-operation of the several branches in making the Women's Exhibit worthy of admiration and honestly typical of the work done by local women. As a result a meeting was held of the Branch Presidents and Secretaries, and a schedule of possible exhibits drafted and certain plans and suggestions offered. This was sent to the different branches. Our branch responded to the appeal because, first, it was our County Fair; second, it was an opportunity to realize Institute ideals in co-operative efforts with the County Board; third, we were being true to our motto, "For Home and Country"; fourth, it helped to boost our Institute as an organization, and last, but not least, they offered $150.00 in prizes and we wanted the money for Institute work.

The different classes of exhibits and number of points of each were as follows: Baking, 15; Canned Fruit, Vegetables and Pickles, 15; Knitting, 10; Sewing, 15; Candy, 5; Fancy Work, 15; Cut Flowers, 10; Specials, including Amateur Millinery, 15; Table Setting, 15. The exhibits to be the work of Institute members only.

At our July monthly meeting we appointed two members to take charge of each class, also two for decorating and two to take charge of our display at the Fair each of the four days. We chose for our colour scheme lemon and blue, and decorated the three booths we used with crepe paper in these colours. The centre booth contained our table setting, a local firm loaning us the furniture, linen, china and glass and flat silver, and the florist giving us a beautiful table centre of yellow roses with bud vases.

The corner booth contained our cut flowers, some fifteen varieties, while the other booth held the candy and cooking, canning and pickles. All the booths were lined with cotton and our sewing, fancy work, kniting and specials arranged around them. The public enjoyed our exhibit and it was a wonderful help to our branch. We asked each member to contribute some articles, and nearly every member responded cheerfully and generously. We were much pleased indeed when our agricultural representative brought us the red ticket.

An Institute exhibit is one of the best means of combining publicity, education and finances, and also we found it a real means of promoting the community spirit of friendliness, usefulness, unity and enthusiasm.

A Clean-Up Day

For Clean-Up Day a committee of two ladies is appointed to engage a man to collect refuse, to secure a suitable dumping ground, and to put up a notice on the bulletin board as regards the date of Clean-Up Day. Each person has his refuse placed at the gateway in bags and boxes, so that the collector has no trouble in picking it up and loading it; nothing that can be burned is taken.

A Clean-Up Day, held the first or second Friday in May, usually results in back yards presenting a much tidier appearance.

IMMIGRATION

EMILY J. GUEST, M.A., PROVINCIAL CONVENER

The reports coming in from the Institutes for the year 1925-26 indicate that the majority of the branches have been active along one or more of the lines recommended last year.

The Armenian orphans at Georgetown receive considerable help, some branches adopting a boy and paying for his support and tuition at the Training Farm, while a number of Western Ontario Institutes have donated showers of handkerchiefs and other clothing.

Active co-operation has been shown with the Dominion and Provincial Government authorities in their work of settlement. Newcomers have been visited and welcomed to the neighbourhood and Institute. A class in English was arranged for at Kingsville to teach non-English men and boys the language. Other branches propose helping the mothers learn English and Canadian housekeeping together by having demonstration cookery at their homes.

Referring to the co-operation of the Women's Institutes in welcoming newcomers from the Old Land, Mr. W. J. Black, Director of Colonization for the C.N.R., says: "The importance of this work in making new settlers feel at home cannot be emphasized too much and in this connection there is no organization than can more effectively carry on such work than the Women's Institutes. I am very glad indeed to see the progress which you are making in this direction."

Mrs. Meade, Chairman for Western Ontario, tells of warm human helpfulness to newcomers, to children's shelters, and to new Canadians whom the branches helped to find themselves to get on their feet.

A touch of romance came in the reception of the brides of overseas' settlers who, having made good in Canada, sent back to the homeland for their fiançes. To ensure a safe and happy passage, they were entrusted to the care of the Women's Branch of the Dominion Department of Immigration and Colonization. The supervisor sent word of their arrival and destination to your convener and where possible each was connected up with a branch Institute, usually with the happiest results. One branch writes: "She is a bright, intelligent and happy little wife. She was very pleased and surprised that the department was interested and is coming into the Institute. We are hoping you will find another as pleasant task for us."

Much kindly neighbouring for all newcomers is done too in helping them get settled and acquainted. Many cases of assistance in illness or need also are reported, the getting of a nurse or housekeeper, the care of children while the mother was in hospital, the righting of injustices towards immigrants, the helping of down-and-outs to get on their feet are reported by the branches, but for obvious reasons cannot be given publicity.

The immigrant who arrives by way of the Canadian cradle is still the most important in the view of the members, and much attention is being given to child feeding, training and education.

A matter which is giving food for thought is that with all our activities in bringing overseas settlers to Canada, we are still losing so many of our own young people to other lands. Just what the cause that takes so many away from a province so rich in both developed and undeveloped wealth is becoming more and more a subject for investigation in the opinion of the Institutes. What are these causes? Can they be removed by wiser legislation, by sounder econ-

omics, by advertising and opening up Ontario resources, by the influence and efforts of Institute members to point out and provide home opportunities?

A country so free, so fair, so prosperous would appear to be not one only worth bringing outside immigration into, but one in which the native born would be happy to abide.

Programme Recommended for the Year 1926-7

1. To secure as full information as possible as to causes for our own young people leaving Canada and to consider how these causes may be removed.

2. To secure as full information as possible *re* children being placed in Ontario homes from:
   a. The Children's Aid Society.
   b. The Salvation Army.

3. To co-operate with the Children's Aid Society in securing good homes for the children for adoption.

4. To take an active interest in supporting the local Children's Shelter.

5. To see that the children of immigrants families or those placed in foster homes attend school regularly and to report all cases of cruelty, neglect or overwork on the part of those employing young help to the proper authorities.

6. To report to the proper authorities all cases of children or parents suffering from contagious or infectious diseases, or who are mentally deficient, and when necessary, to take any other action advisable.

7. To secure as full information as possible of new families settling in Ontario or of girls and women employed in homes throughout the province from:
   a. The Women's Branch, Department of Immigration, Ottawa.
   b. The Colonization Department of the Ontario Government.
   c. The Employment Labour Bureau, Toronto.
   d. The Land Settlement Branch, 32 Adelaide Street East, Toronto.

8. To secure the names of newcomers, visit and welcome them, whether native or foreign, to the community and into the Institute where they may imbibe and contribute to the highest ideals of home-making and Canadian citizenship.

9. To familiarize Institute members with the immigration laws, and to emphasize through lectures, discussion, debates and written articles the importance not only of right reception but the careful selection of newcomers to this country, basing choice on health, character, ability to do the kind of work necessary in a young country, and adaptability, more than on moneyed qualifications.

10. To encourage the dissemination of available information in the form of literature, and short courses available from the colleges and Government Departments, which shall tend to lower the death rate and raise the general standards of life among the cradle immigrants of Ontario.

Helping the New Canadian

In the western suburb of the town are situated two large stone quarries in which many new Canadians find employment. In the summer of 1912, among others, there were six Italians living in a shack, all from different parts of Italy, having never met until they came to Ontario. One of these men had attended a night school in Canada and had learned to sing hymns. This man brought in the other five. The leader, talking with these men, found them very anxious to learn English. When some of the citizens heard of this they subscribed to

build a small mission in the west end. It seemed necessary to have the building right in their midst as they would not come down town. Lessons in English were taught three nights a week with splendid results. There was also a Sunday School for the children on Sunday afternoons. The teachers went to the homes of the people inviting them all to come. At first the foreigners seemed surprised that so much should be done for them and nothing asked in return, but soon they learned to not only trust, but love and respect those teachers who, without remuneration, worked among them.

To these classes came a little girl named Maree; she was Canadian born with Italian parents; a very intelligent child. At first her clothing was made up of a mixture of style, some of the old land, some of the new; a long braid of golden hair tied with a bit of bright yarn, coloured stockings and coarse shoes. But if she was lacking in the niceties of Canadian dress, she did not miss anything in the way of instruction.

She declared her determination to get some work to do so as to be able to get clothes as other Canadian girls had. She did this, finding work in the office of one of the quarries.

As she grew older she was very anxious to enter High School, and worked her way, paying for her clothes and books for two years. Then, because of conditions at home, she thought she ought to make her living.

It is the custom in Italy for a father to have much to say in the choosing of a husband for his daughter. Maree, having become Canadian, decided she should have freedom in this matter.

In a talk with her teacher it was decided that a commercial education would give the best chance for Maree to become independent. The teacher made a visit to her home, placing before her father the advantages of such an education. The father did not feel able financially to give this to her, but he agreed to accept the teacher's offer of caring for Maree as to funds for tuition and board, books, and necessary clothing.

So Maree now has her Commercial Certificate, having taken a twelve month course in stenography, typing and business education, thanks to the Women's Institute which provided money for her tuition.

A word may be said here: Strive to gain the confidence and respect of the new Canadian and you will be able to help him.

English and Housewifery Together

The members of a Branch where many foreign speaking newcomers were arriving, exercised their minds and hearts as to the best ways of making them feel a part of the community. The children of school age quickly adapted themselves to the new language and surroundings. For the men, with the co-operation of the teaching staff of the neighbouring village, evening classes in English were provided. But for the mothers, What? Being adults and shy, busy with young children, ignorant of the language, of the ways of Canadian homemakers, if invited to the Institute they grasped little of what was being said and still felt very much like strangers.

The happy idea presented itself to some of the members of taking a demonstration to the home of one, who invited others in of the newcomers, using the English word for each utensil employed in the demonstration. They combined the teachings of the language, Canadian housewifery and friendly Institute co-operation in each visit to the appreciative new Canadian homemakers, who rapidly began to lose their feeling of homesickness in a strange land.

RELIEF

MRS. D. D. GRANT, MOOSE CREEK, PROVINCIAL CONVENER

The Institutes in most localities have done a great amount of relief work. In spite of the occasional Institute, which devotes all its energies to making money, which is felt to be a mistake even when the moneys are for good ends, the organization is keeping up a high average of devotion.

Looking over the classified activities of the 35,000 members in over 1,000 branches, we realize "Relief" rates high, but we can do more and not only give sunshine to many more, but therefore enjoy much more ourselves. This report is not to let others know what we have done and are doing, but to educate and to awaken us to the best way to carry on the work according to the golden rule, "Do unto others as you would have them do unto you."

I would suggest that a report be sent to the Chairman in time to prepare a report for the Convention, and that each branch should have a Relief Committee to look after same. In each branch its own community work comes first, and no hardships or suffering which it is possible to relieve should be allowed to continue. Let us always be on the watch for the opportunity to help.

REPORT BY MRS. A. E. WALKER, BARTONVILLE,

CONVENER FOR CENTRAL ONTARIO

Relief in its many phases, is one of the most important features of Institute work, and it would be difficult indeed to find a branch not engaged in philanthropic work of some kind. The lines of activity are many and varied, for the Women's Institute members do not confine their efforts to the relieving of financial distress alone, but they have broadened their horizon, and are doing all sorts of kind neighbourly acts, thus contributing to the comfort and happiness of those in their midst. From our Institutes we hear of all sorts of philanthropic work, from the supplying of labour and material for the roof of a poor woman's home to the sending of Christmas boxes of home-made cooking to bachelors living alone.

It is quite impossible to describe fully the many splendid charitable activities reported by our branches, therefor I will simply give you a synopsis of them, hoping you may carry away ideas that may be helpful. Following are some of the activities being carried on in our Institutes:—

1. Supplying families or individuals with food, clothing, bedding, furniture, etc., where distress has arisen through sickness, fire or unemployment.

2. Contributing to such charitable organizations as Navy League, Armenian Relief, Blind Veterans, Miners' Relief Fund, and Blind Institute (also selling their brooms and basketery).

3. Assisting Children's Shelters, Sick Children's Hospital, Queen Mary's Hospital for Sick Children, by donations of fruit and money.

4. Treats of various kinds to hospitals for returned soldiers. One Institute gives annually a strawberry social to the Soldiers of Christie Street Hospital. About 100 soldiers and their nurses, Red Cross visitors and chauffeurs, are entertained on the lawn of a member's home for the afternoon and at 4.30 are given a supper of strawberries and cream, sandwiches, home-made cake and tea, coffee and milk. This same Institute has a shower of apples which they send to the Christie Street Hospital in time for their Hallowe'en party.

5. Personal visits and showers of fruit, candy and Christmas boxes for inmates of Houses of Refuge, also social afternoons to the old ladies in the neighbourhood, celebrating their birthdays and helping Boy Scouts and Girl Guides.

6. Sending flowers, fruit and Christmas cheer to those ill or shut in. One branch contributes money monthly for Duffield Flower Mission.

7. Finding employment for the breadwinner of the family and assisting mothers in obtaining the mothers' pension.

8. Making layettes for needy mothers—one Institute reports keeping two always on hand.

9. A wonderful work is being carried on in Orillia along "Maternity Hospital Cot Lines." After their war memorial was completed, the Women's Institutes thought they would like to do something worthy of our noble motto, "For Home and Country," so decided to care for needy maternity cases. This they do, by paying the hospital fee (from $25 to $30) of all cases which they consider deserving of assistance, after such cases have been thoroughly investigated by their committee appointed for that purpose.

10. Making garments for Children's Shelter.

11. Sewing and knitting for Infants' Home.

12. Taking as guests in the home during the summer vacation, children of poor parents. A rural branch organized less than six months reported taking in their homes, as guests for two weeks, poor children obtained through the Neighbourhood Workers' Association—a very praiseworthy act indeed.

13. Loaning sick room supplies to people unable to purchase same for themselves. One branch reports having bought an air bed, air pillows, a stone pig, etc., which they loan out to anyone in the community desiring or needing them. This same branch is the proud possessor of a very charitably disposed woman, who gives for a very small fee or, if necessary, free of charge, her services in nursing the sick, either whole or part time.

14. Helping County Hospitals is fast claiming the attention of our Institutes, as many such hospitals are being established. Wherever there is such an institution, there can a real service be rendered by our Women's Institutes, for in those small hospitals there is so often a dearth of comforts and luxuries, often of necessities, because of lack of funds. Our women know this, and we have reports of branches supplying furniture, a rug and day couch for the nurses' room, also electric washing machine and stationary tubs with the necessary plumbing. One branch installed an electric buzz system to replace the old hand call-bells, thus eliminating labour and ensuring quicker service.

15. By having a school committee and keeping in close touch with the teachers, much distress in the school is often relieved. For instance, two two branches paid for tonsil and adenoid operations and two branches paid for glasses for poor children.

16. Another branch has been clothing and sending to school two deaf and dumb children. These adolescents must attend school until they are twenty-one, when they will have learned a trade and be self supporting. Although it is quite a burden, the Institute reports that they feel well repaid for their trouble and expense.

17. Another branch when it built its booth for serving refreshments at the fair, had it built large enough that a part of it could be spared for a rest room, free of charge, for women with children. Needless to say, it was well patronized and much appreciated by mothers with children. In many cases the children were given fresh milk, bread and butter free of charge.

18. Another truly neighbourly act is reported by a Junior Branch. The girls went in a body, taking their working utensils and also their lunch, and house-cleaned a ten-roomed house for an invalid who could not procure efficient hired help. The girls have done this twice and are looking forward to doing it again next spring. Such thoughtfulness speaks well for our young girls.

Thus we see that through the many splendid charitable activities being carried on in our branches, we are rendering to humanity a real service, and service we know is the underlying principle of our motto, "For Home and Country."

COMMUNITY ACTIVITIES

REPORT BY MRS. MALCOLM MACBETH, MILVERTON, ONT., PROVINCIAL CONVENER

The excellent reports which have come from the various parts of the province are ample evidence of the extent and outstanding importance of the work being accomplished by this aggregation of representative women of Ontario, for the betterment of rural community life. The Women's Institute is a Good Samaritan by the wayside. It brings to the door of every woman, no matter where she lives or what her circumstances are, information and assistance in practically anything she might or should be interested in. It has been said that "Flattery is the food of fools, but now and then some men's wit can condescend to take a bit." The regret is that praise so often is all too stintingly given or withheld altogether till those meriting it have passed beyond recall, when it is said with flowers. On perusing the reports, one cannot but be persuaded of what the poet said,—

"You cannot speak of woman's sphere,
As though it had a limit;
There's not a thing in all the earth,
That has a featherweight of worth,
Without a woman in it."

"Home and Country" is our motto, so naturally home is our first concern. What the mother is to the home, the Women's Institute is to the rural community—meeting prevailing conditions as they exist in the several areas—north, east, centre and west. From sending stockings to motherless children, helping a sick mother, keeping a layette on hand for the next baby who needs it, and welcoming the stranger from overseas, the benefactions are endless. When calamity comes, such as the Northern Ontario fire, or a neighbouring family is burned out, the Institute turns its energies to relieving the distress incurred.

The school is of special concern where the health, education and welfare of the children have attention through the arranging for hot school lunches, outdoor sports, supervised noon hours and school fairs. In the community in general, there is wide scope for activity. No task is too hard; the Institute arranges for Garment-making Clubs, Choral Classes, Debating Societies, Softball Tournaments, Athletic Sports and Community Christmas Trees. It provides a staff and flag for the school, equips and maintains rest rooms for the public, puts down sidewalks, installs drinking fountains and street lights for the town, cares for neglected children and cemeteries, beautifies the parks, starts libraries and [illegible]

out, making them up-to-date community centres. It erects memorials to the fallen heroes and arranges annual decoration days to perpetuate to the mind of the youth of to-day the sacrifice of the youth of yesterday.

The Institute is sponsor for the social life of the community. How is all this accomplished? By the unselfish giving of time in serving suppers, catering at banquets, holding garden parties, conducting booths, putting on plays and entertainments, appealing to councils for financial assistance and innumerable other ways and means, the wherewithal necessary for the successful carrying on of all these undertakings is forthcoming.

"It's doing your job the best you can,
And being just to your fellowmen;
It's figuring how, and learning why,
And looking forward and thinking high,
And dreaming little, and doing much;
It's keeping always in closest touch,
With what is finest in word and deed;
It's being clean, and playing fair,
It's laughing lightly at Dame Despair;
It's sharing sorrow and work and mirth,
And making better this good old earth;
It's serving and striving through strain and stress;
It's doing your noblest—that's SUCCESS."

Time will not permit me to go into details of the activities, but such a review enables one to comprehend in a measure, something of the fine work being done for the communities. We women cannot but be benefited individually. Thinking and working together for others, our sympathies are enlarged, our outlook broadened, our knowledge increased, and our lives enriched. Our work, valuable as it is to the communities, brings to us its own reward.

Let us therefore continue—

"To do something for others always,
Whatever may be our creeds,
There's nothing on earth can help ourselves,
As much as kindly deeds."

BY MRS. ALBERT WALKER, EADY, ONT., CONVENER FOR CENTRAL ONTARIO

Reports on—A. Work in, for, or about Community Halls.
B. Town Improvements.
C. The Best of Good Fun.

A. Community Halls:

One branch had a hall in their community that had been started two years before by a company of men. There was only a basement, but in less than a year there stands to their credit a beautiful cement block hall, 26 by 56 feet, with kitchen, hardwood floors, and only a very small debt.

Another fine community hall, run on almost a cost basis, needed fire escapes, whose installation the Women's Institute financed. Where there was not a community hall, the Women's Institute bought an old building, made money in the customary way—by gardening parties, and social evenings—paid for it, and are still busy and happy earning money to pay for cement walks and more windows which they have to put in.

Where there was no community hall the Women's Institute bought a suitable building which was for sale to give their young people a place for proper amusement and entertainments. It has cost them over $700.00, but as their secretary says, "It is well worth it."

A lake port had no community hall, but there was an unused church and a brick parsonage. The Women's Institute was not able to buy these buildings, but for keeping them in repair were allowed to use them, and a delightful social centre they have made. The house is comfortably furnished and is used for Women's Institute meetings and small gatherings, and the church, which they have shingled and re-decorated, is used for concerts and lectures.

B. Town Improvements:

A drinking fountain was placed in one town and the Agricultural Society furnished with seats which will give rest to 100 people during Fall Fairs and public meetings.

The need of better accommodation for bathers aroused another branch. The town council recognized their efforts and voted $150 to the bathing beach fund. The old bathing house was enlarged and repaired and another built. The town was then canvassed for subscriptions to pay a good supervisor, who looked after the young girls and children, much to their mother's peace of mind. A pleasant rest room in the centre of the town is opened and closed by the town constable, and a woman sweeps and cleans it once a week. The expenses are met by donations from merchants and by teas, concerts and plays, managed by the Institute.

Sidewalks were laid on both sides of the street with money raised by sewing, ice cream, lunches at fairs and several concerts and plays, which brought out a great deal of unsuspected talent in the Institute members.

A village had street lights installed, also danger signals, lights, and a wigwag at the crossing of the railway.

A wonderful flower bed put in their cemetery got people interested in their family plots to such a degree that what was once an eyesore is now a local beauty spot and people who are far away write to have their plots cared for.

C. The Best of Good Fun:

A live branch Women's Institute joined with the Junior Farmers in putting on a June Field Day. In the afternoon they had hard and soft ball matches, and after supper served by the Institute in the Agricultural Hall, a play was put on by a neighbouring village. A play of their own, "The Prairie Rose," made $65 for their public library. Another branch have social evenings weekly, two of the members providing the refreshments. All bring their work and they spent a happy evening together, paying 15c for the lunch. Another Institute gave a picnic at the home of one of their members. The proceedings were as informal as possible. No admission. A programme of sports is carried out, and supper is served with everyone seated on the grass. Both old and young, husbands included, attend. Not having a community hall, one Institute engages the Town Hall and from November to April has social evenings, plays and most carefully supervised dances once a month. A most interesting little Women's Institute does a beautiful thing. The Children's Aid Society have a summer camp near and each year they take their own children and lots of good home-made delights and give the camp children the most wonderful day of a wonderful holiday.

"He who gives a child a treat,
Makes joy bells ring in heaven's street;
While he who gives a child a home,
Builds palaces in Kingdom come."

The interchange of visits between branches, picnics in the summer and social evenings in the winter, gives much needed social recreation. Meals served at the Athletic Association Field Days and a Block Fair, gave the people a wholesome good time and made money to carry on other Institute activities.

REPORT BY MRS. ETTIE EATON, ATHENS, ONTARIO,
CONVENER FOR EASTERN ONTARIO.

In attempting to report on the Community activities of the Institute Branches in Eastern Ontario for the past year, I find the task no easy one.

With one hundred and sixty live branches, well organized, with the motto "For Home and Country" ever before them, banded together for real service and seeming never to weary in well doing, who can sum up the year's activities or estimate the mighty force for good.

I have received many excellent reports and in studying them I could think of but one word, the most expressive work in any language—MOTHER. What the mother is to home, the Institute is to our rural Canadian household. Follow Mother Institute as I quote from reports I have received. She makes layettes for tiny twins, and remembers all the new babies in the rural community with little gifts. As the wee ones attain school age, her interest follows them to see that their health, comfort and education is of the best. As her children grow older, Mother Institute, realizing that the most precious of all Canadian possessions are our girls and boys, endeavours to provide clean, wholesome play and supervised entertainment. Softball, basketball, skating rinks, clubrooms, libraries, debating societies, assisting the hockey boys, helping the Girl Guides, banqueting the Tuxis Boys, holding Mother and Daughter banquets, are a few of her reported activities.

This is followed up by the Girls' Garment Making Clubs, dressmaking and millinery courses. The girls are getting older and are receiving a liberal education. Now we hear of a shower for a bride. The bride is wise and takes advantage of the training Mother Institute offers in the Domestic Science Course, study of home economics and home nursing and first aid. Believing that only a happy contented people make for a strong and prosperous nation, the living conditions receive attention. Cement sidewalks are laid in the village, street lights are installed, community halls erected and equipped, rest rooms and libraries provided, fire alarms and fire-fighting appliances secured, parks purchased, flowers and shrubs distributed and cared for, cleaning up day held, road signs and bulletin boards erected.

With true motherly love, the unfortunate ones are remembered, the sick, the crippled, the blind, the poor, the fire sufferer, received attention that your relief committee will no doubt tell you about. Years steadily roll on and we hear of Grandmother's Day, which we all love and appreciate; yes, and of course, Grandfather's Evening, which you will hear about later. When Mother Institute can do no more for her children here, we find her carefully caring for their last resting place and making the cemetery a place of beauty, as well as of sacred memory. This is a very dim picture of the Institute life of the year, but can

you not see where the motto "For Home and Country" has been honoured, and that conditions surrounding community life have been improved? And this is a picture of the material side only. Who can estimate the development of mutual good will, the abiding fellowship and sisterly love that begins when neighbour meets neighbour and spreads through the branch, district and province, reaching from coast to coast and steadily building up a more glorious Canada.

A Block Fair

For a Block Fair, the first thing necessary is to secure suitable space; a street, vacant lot, or market square is roped off, and it is around this that booths are arranged as follows:—Home-made baking, ice cream and soft drinks, home-made candy, flowers, weiners and rolls, home-made pies, miscellaneous, balloons and punch board, also a portion roped off for a tea room.

One branch reports as follows: "In connection with this we ran a fortune-telling booth; later in the evening a centre of the square is marked off and surrounded with benches for dancing (Jitney). We usually have the square wired by Hydro so that we have a very bright display. On account of having the square roped off we are able to charge 10c admission fee, which is one of our best features for making money. The articles for sale were mostly donated by members and their friends. Some articles have to be bought and these are generally supplied by the local merchants at a reduction. This affair is annual and is looked forward to by the general public. Any article left could be auctioned off at the close, or could be saved for the following year."

Cemetery Improvement

There are four cemeteries and for years the appearance was, to say the least, untidy. The women of the Institute decided to do something, so, after a great deal of work, they had a "bee" and managed to improve the appearance of the cemeteries. Money was needed, so they held socials and suppers. The work was found to need a man to take care of the cemeteries; the members decided to engage a man to take care of the cemeteries and with the help of the council, who have given help ever since, the money was raised.

Cobblestone pillars are built in place of the broken-down wire fence and in an unobstructive corner of the cemetery is a tool shed in which to keep the implements used by the caretaker.

The plot owners in the cemeteries have been asked to pay a fee each year for the care of the cemeteries and the majority have responded well.

This work is to be kept going by the Institute and the neighbourhood feel grateful for the good management and the cemeteries are no longer an eyesore to the community.

Neighbourhood Co-operation

Some unique instances of neighbourhood co-operation appear where: A branch meeting from house to house does a bit towards any needed mending, darning, knitting or quilting of the hostess.

An Institute Committee was appointed to meet with the Township Council in an effort to secure Hydro.

Shares were purchased in the skating rink and dressing rooms built at the bathing pool with money raised by a Hallowe'en masquerade party.

The Institute helped the young men by catering for their banquet

Village Fire Protection

One Institute furnished the village with a fire extinguishing outfit. It comprises one soda tank which contains twenty gallons or more, a number of feet of hose, one large hand extinguisher, two extension ladders, one forty feet and one twenty feet, twenty-five pails, two shovels, one axe, also an electric heater to keep the building warm during the winter months. This has proved a wonderful help to the community. Two very bad fires were put out, several dwellings saved. A two-wheeled hose wagon, with everything on it ready for use, can be drawn behind a car and a fire reached in a few moments. It is intended to buy another tank, to save refilling.

Parks

This work commenced a year ago. A bee was organized among the young men, who willingly helped in cleaning up the park and laying a cinder driveway. This took two Saturday afternoons, the members of the Women's Institute supplying refreshments for them. Since then considerable money has been raised in the following ways:—Crokinole, euchre and bridge parties have been held, lectures given, baking sales held, a local play given, and over $180.00 profits realized from sale of cook books. This money has been expended in building a cook house, fully equipped, tables, benches, swings for the children and signs placed at two entrances to the town.

How A Community Library Was Established

This Institute was organized in January, 1925, and fifty members joined. There were eleven meetings held with an average attendance of twenty-five members at each meeting.

A library was established, called Micksburg Community Library, and is carried on by a committee of the Micksburg Women's Institute.

There are 269 books in the library, which is kept in one of the member's home, and this member who acts as librarian, gives her services free.

This library is open every day, and our rules are:—

1. A fee of two cents to be paid on applying for use of book.

2. The books to be returned to the library in good shape within one month from date of getting books.

3. A fine of three cents a day to be paid by a person keeping a book after the month has expired, until the book has been returned.

The circulation of books for eleven months was 800 and in the income was $17.04. Fees amounted to $16.00 and small donations and fines were $1.04.

Thirty-nine books purchased and the remainder of the 269 were donated. The Institute donated $20.00 towards buying new books, and twenty-five books were purchased. The remainder of the thirty-nine were purchased with the money derived from the fees. The books came from the business men of the surrounding towns and some of the members of the Institute. Several of the Institute members who were greatly interested in the library made appeals to those men and they all gladly assisted by giving books or money.

The committee decides upon ways to raise funds for maintaining the library apart from the funds the Institute donate, and just now a bean contest is in process.

The committee decides upon the date to meet for the purpose of repairing and ordering new books.

LEGISLATION

Mrs. W. R. Lang, 55 Woodlawn Ave., Toronto,
Provincial Convener

After a reference to the splendid work being done by the Women's Institutes of England, Mrs. Lang reported that the local Ontario Institutes still do not send in much direct news of what they are doing along these lines, though many of them are studying the laws affecting women and children; others are interesting themselves getting women on the school boards. One has sent a resolution asking for the vote of farmers' daughters on the same terms as farmers' sons, and many individuals write to me either for information or sympathy, and I am glad to give them both.

One letter received asked what were the duties of the local convener of the Committee on Legislation. Briefly I would say they are:—

(1) To arrange for a meeting or a study club on some aspect of our laws.

(2) To receive and answer, or else send on to me, enquiries with regard to the laws.

(3) To keep an eye on all that goes on in the Municipal Council, to get two members of the Institute in turn to attend the meetings and to report back to the Institute.

(4) To appoint someone each month to report on current events.

(5) During the session of the Legislature, to watch the papers and note bills given first reading, and if interesting to the Institute, write to the King's Printer for a free copy and read it carefully. Governments are only human and they are our representatives, and it is for us to advise them as to whether suggested laws meet with our approval or not, where we are the persons with practical experience; and our comments are more acceptable before the law is finally passed than afterwards.

Nearly all the letters received have had something to do with guardianship of children, wills, and the unsatisfactory nature of the present economic position of married women. Many of these letters I can answer myself, but I would like to record also my gratitute for the assistance of the official guardian, two judges, a K.C., and last, but not least, one of the women lawyers of Toronto, Miss Vera Parsons, all of whom have given me cheerfully and freely of their busy time on various occasions. It is interesting to note that these questions are agitating not only the rural but the city women; not only Canadian women, but those from England, Scandinavia, Austria and every other country. I told you last year of the good sense of the citizens of Scandinavia in facing this problem and in recognizing by law the fact that marriage is a partnership of two persons, differing in the kind of service which they render to their mutual undertaking, the home, but each equal before the law in their responsibilities and economic standing. No longer in Sweden do they talk of a husband "supporting" his wife; they both support the family, he by working outside and she by working inside, and the financial responsibilities of the wage earning partner is not finished until he has contributed to his wife, in addition to the housekeeping money, a personal allowance, which is her own to spend or save. As you know, a case in British Columbia was given against the wife, who during the war did her own housework in order to be able to save the wages of a maid to subscribe to the Red Cross. It was ruled that money given to her for a certain purpose, in this case housekeeping, was not her own to spend or save. Hitherto, in Ontario, the married woman's Property Act has definitely stated that a

woman's earnings are her own in any occupation in which her husband has no proprietary interest, and also money which she earns by her own literary, artistic or scientific skill. But this law was redrafted this year, and this clause has been left out, and it looks as if no ruling has been made as to when a woman's earnings are her own. What exactly will be the result of that I do not know.

Turning now to the economic position of the widow—I have consulted many people as to how this might be improved. As one lawyer said, "There are three types of men who make wills: There is first the man who does not make one at all; then there is the man who, like your husband, makes his wife his executor and trustee and leaves everything to her, either absolutely or for her use during her life, and in trust for the children after her death; and there is the third type, who does not seem to recognize any obligations after his death to his wife at all." As you know, if a man does not make a will, the state steps in and definitely divides up his property between the wife and children in the proportions of one-third to the widow and two-thirds to the children. With regard to the second type of man, I find different views even among lawyers. Some think a man should trust his wife with everything, as she is naturally anxious to look after the children and their interests. Others say it is safer for the children in case she marries again or goes into business or is led astray in her investments, to tie up at least part of the capital, which in that case is saved at her death for the childern. Circumstances alter cases, and we must admit that not all women are perfect and that quite a few are not good business women. Incidentally, it would be better if all women knew more of their husband's business affairs and were consulted and interested in investments and money matters. Turning to the third type of man, the one who does not seem to recognize his responsibilities to his wife and children, their lot is certainly a hard one. As you know, the existing law is that a man cannot deprive a woman of her dower, i.e., a life interest in one-third of the real estate of which he dies possessed. He may leave his legitimate children without a cent, though his illegitimate children are a charge on his estate until they are sixteen years old. Before I make suggestions as to how this state of affairs might be remedied, may I point out, because several letters received showed that some of our women do not understand this matter, the following: When a man dies there are two distinct things involved—(1) the custody or guardianship of the person of the children, and (2) the care and administration of his estate, which itself is divided into two parts: (a) a personal estate, i.e., stocks and shares; (b) real estate, i.e., land. Now, in all cases, the widow is the legal guardian of the children's persons, but, except in so far as her dower goes, she has no right to the control of the property, except as the husband wills it to her. Two or more of our provinces have coped with this problem. Manitoba has repealed its Dower Act, and has substituted a law that a man must leave his wife the equivalent of one-third of his net estate, i.e., one-third of his real and personal property. The British Columbia law is that if a man who is able to do so does not leave his wife sufficient to support herself and children in a style comparable to that which she has enjoyed during his lifetime, she has the right to appeal to the Supreme Court, which may alter the will so as to fulfill such a condition. Mr. Lethbridge, the member for West Middlesex, brought in a resolution to make it compulsory for a man (or wife) to leave his wife or her husband at least half of their net estate. This was only a resolution and I do not think it passed. Neither did a bill which called for the necessity of a man leaving his wife at least one-third of his net estate. The arguments brought forward against it was that a man had a right to do what he liked with his own, but, as Judge Middleton

said, "A man who marries and has children has given away by his own will *and by the law of the land the right to do as he likes with his own*, because he is bound by law to support them while he is alive, and both he and the state should recognize the same duty of support after his death." He also advises us to work for the abolition of the Dower Act and the substitution therefor of a law similar to that of British Columbia plus a clause making the cost of *maintenance of children up to twenty-one years of age, a first charge on the estate* after paying all bills. Another suggestion which Miss Parsons and I worked out was that we should work for a minimum legacy for the wife of one-third of the net estate, with an appeal to the Supreme Court for a bigger amount if this share did not fulfill the British Columbia condition of maintaining the wife's status equal to that which she had before her husband died. To this suggestion also would be added the one to make the support of children under twenty-one years of age a first charge on the estate. This is a very difficult matter, but we should think it out, talk it out with representatives of the Ontario Provincial Council of Women, and then send a representation with them to the Government before its next session and state our request for legislation during the coming session.

Turning for a few moments to new legislation during the last year, there is not much of immediate interest to us. Much time was spent in codifying existing laws with a view to the new Revised Statutes that are to be issued shortly. There was a new Representation Act, which gave more representation to Toronto at the expense of the rural constituencies. Toronto will have fifteen members, or nineteen including the suburbs that are partly in York County. Notice also in the Election and Voters' Lists Act, that the qualifications for voting for a *provincial election are slightly altered*. A person to vote must be twenty-one years of age, a British subject, a resident of Canada for a year, a resident for two months in the electoral district, or in the case of a city with more than one electoral district, a resident for two months in the city, and one month in the electoral district. Notice also that every schoolmaster in the municipality should receive a copy of the Voters' Lists Act, and his duty is to hang it up on the door of the school, and yours to see that your name is entered on it. Please remember that though the farmer's daughter may not vote, she is eligible for election as school trustee, and even though the wife owns no property and therefore does not pay any taxes, she may now vote on her husband's taxes and *vice versa*, but she is not necessarily on the assessment roll as the joint owner of the homestead, and so is not eligible for election. I have already referred to the Married Women's Property Act, As one lawyer in town naively remarked to me, "You know there is a new Married Women's Property Act, but it remains to be seen how it will work out, until it has been tested in the law courts." It does seem a pity that our laws work out to be complex, so complex that no one knows what they mean until there have been law suits to decide what they do mean. Lending libraries other than municipal and religious ones must have a permit.

There are still matters needing our attention. New citizens are still being added to the roll of British subjects by judges, although they cannot speak French or English, and in consequence can vote at our elections through interpreters with all the chances of corruption that that entails.

The legal age at which a boy or girl may marry with their parents' consent is fourteen years, and in 1924 there were five married mothers in Canada under the age of fifteen years. This is a scandal. Parents who would give such consent ought not to be allowed to do such a thing. A recent investigation under the Russell Sage Foundation revealed over 1,800 native white brides in the

U.S.A. of whom huge numbers were the victims of exploitation, literally sold by their parents and an easy prey to the white slave traffic. The wives and families of prisoners are still left destitute if a man serves a term in gaol, except in those few cases where he is made an extra-mural prisoner. Miss McPhail's resolution on this subject in the House of Commons was talked out. Betting on race tracks still remains legal. Boys under eighteen years of age are not included in the Minimum Wage Act, with the result that certain employers who do not want to pay the minimum wage required by law are dismissing the girls and employing boys at a lower wage.

These and other matters which come partly under legislation and partly under some other department, as for instance the compulsory teaching of domestic science in the schools of Ontario, should be taken up with the Government.

Mrs. F. Haggan, of Aylmer, Convener for Western Ontario, reports branches interested in the study of Laws of Ontario regarding women and children, also the enforcement of the Curfew Law in small towns and villages.

Mrs. Jessie McIntyre, Renfrew, Convener for Eastern Ontario, reports, in addition, studies of the Postal Rules and Regulations, Banking Rules and Motor Traffic Regulations. One branch enrolled a member in the League of Nations Society in Canada, in order to keep in touch with everything of importance to the home being dealt with there.

HISTORICAL RESEARCH

MISS ELIZABETH APPELBE, GEORGETOWN, PROVINCIAL CONVENER

The work is growing in interest. Several counties have appointed committees with conveners. Grandmother's Day, with reminiscences and exhibits of early days, is an annual event in many Institutes. Exhibits of antiques begin to be a feature of some Fall Fairs. Sketches of the history of their community have been compiled by some branches. Mrs. R. J. Graham, of Ripley, Convener for Western Ontario, reports notes and maps of original surveys, lists of early settlers in Huron township, and papers dictated by aged pioneers, as being collected.

To compile a County History should not be an impossible task, if each branch would appoint an archivist whose duty it would be to collect historical data and transmit it to a central archivist for the county. Perhaps some counties are fortunate enough to possess authentic and comprehensive records of their history, but I fear most counties, if they have any record at all, find it inadequate and probably not authoritative.

Regarding Township History, suggestions were given in the 1925 report, but people still often ask, "How can I make a start?" Begin with the nearest thing, perhaps the history of your home farm, if you live on a farm. If your family are fortunate enough to possess the Crown deed, which means unbroken residence, then surely there must be in the family interesting reminiscences of pioneer work and customs handed down through the years.

When you have collected all possible facts concerning your home, try taking just one concession line or section of it. Then extend to next concession, and so on. If you live in a village or town, find out where and by whom it was first settled. What were its early industries and what are those of the present and by whom were they established.

Then extend the work throughout your county; learn where the first settlers located. Did they come in families or in groups?

Note any changes of boundaries. Locate the first school and the first church. When did the railways first come to your county? Have any of the citizens of your county distinguished themselves as authors, artists, statesmen or financiers, or as musicians?

You will ask how am I going to secure this information? I can only reply, you must work for it. Get it anyway and everyway you can honestly, but be sure it is authentic.

This report of work should be an incentive to any branch which has not already undertaken work along the lines we have mentioned.

We should always bear in mind that while the work of this committee can be made most interesting and entertaining, we must never lose sight of the fact that it is of great importance not only to our local communities, but to our country, to our province and to the Dominion of Canada.

MISS M. H. MCGUIGGAN, ELGIN, CONVENER FOR EASTERN ONTARIO

Although this committee was formed only last autumn, interest along the lines of Historical Research had already been evidenced in many branches, and during the past year, many more branches have taken up the work. While many phases of the work readily suggest themselves to the members of any branch, valuable suggestions were issued by the Department early in the year, and the report of our Provincial Chairman, Miss Appelbe, which is incorporated in the Women's Institute Annual Report for 1925, cannot well be improved upon for valuable and practical suggestions. We trust you will read them carefully and carry them out to the best of your ability.

In looking back over our study of history in school, do we not think of it chiefly as a dreary succession of kings and of the wars which each king made upon his neighbours, while more interesting things such as the way men lived and what they thought and achieved were passed over? In our study of history, as Women's Institute members, especially in the study of local history, one of the chief objects will be to gain greater insight into the everyday lives and thoughts of our ancestors in this country. While some writers have passed on to us very interesting records of pioneer days in Canada, which gives us a general idea of the conditions existing a century or more ago, they could not possibly acquire information from every locality; and yet every village and community has a history which should be preserved. This is a fact already acknowledged by the different Historical Societies in Canada, but they have not the facilities for obtaining such histories. What is more reasonable than that an organization whose branches reach (or will shortly reach) every rural community, should undertake the work of gathering and compiling local history? Many branches have already undertaken this, some more thoroughly than others. To interview the old people of the community, who are fast dropping away and taking their valuable knowledge with them, is no light task, but it is a very interesting and necessary one if we are to obtain the information we should have about our early settlers and their modes of living, what they had to contend with, and how we are reaping the benefits of their years of toil and privation.

In some districts, the history of the settlement is prepared by the secretary and read to the school children at a special meeting held for their benefit and published in the local newspaper.

In one centre an Historical Research sketch was given in connection with a most interesting entertainment, "A Curio and Antique Show," arranged by the Institute.

In one branch the year's programme includes sketches of six of the oldest farms in the community with reference to some of the pioneer familes who occupied them. A history of the Rideau Canal and the conditions which led to its construction was also given during the past year.

A number of branches in connection with "Grandmother's Day" have been entertained with very interesting reminiscences, which we trust they will preserve in writing. At these meetings also splendid exhibits have been made of "Something of my Grandmother's," "Old-Time Weaving," "Old Photographs of Places and People."

The Maitland Institute set up a marker and flagpole on the site of the first white inhabitant of Leeds and Grenville. The flag is to be left flying during the summer months. At the unveiling of the marker and unfurling of the flag a very impressive ceremony took place, and attractive folders were issued by the Institute, giving necessary information, as well as a copy of the programme.

CANADIAN INDUSTRIES

MRS. GEO. EDWARDS, KOMOKA, PROVINCIAL CONVENER.

The Chairman of the newly formed Committee on Canadian Industries submitted the following questions to the delegates at the Conventions:—

1. In your daily buying do you ask for Canadian products?

2. Do you buy the foreign article, first, because it is cheaper; second, because there is no similar article in Canada, and third, because the quality is better?

3. Will you please furnish a list of goods produced in Ontario or in Canada that are not equal in price or quality to similar foreign made articles?

4. Do you think that if our women constantly demand home products your local retailer will supply them? If you believe that a strong and loyal home market will attract new industries and settlers, which in turn will reduce the individual burden of taxation, will you pledge yourself in your daily buying to ask for local, Ontario, Canadian, or British Empire products?

With these as a foundation for her address, Mrs. Edwards urged that these questions be taken home to the Women's Institute members by the delegates, and she also stated that her desire was to have these questions answered on paper and sent to her. Mrs. Edwards stressed the need of buying at home. She also pointed out that in this matter her ideas were not political, but rather were of deep interest in Canada and Canadian people.

Mrs. J. E. Caldwell, City View, Chairman of Standing Committee on Canadian Industries for Eastern Ontario, addressed the Ottawa Convention as below:

"It is not straining a point to say that during the past few years Canadians in all parts of our country have been somewhat despondent. Wearied and nerve-torn by the losses and crosses of the Great War, faced with unprecedented debts and obligations, it would be quite unnatural did not a period of lassitude and pessimism follow. The national and individual batteries were run down

and time and the recuperative processes of nature can alone restore efficiency and fire.

At such a time it is helpful to take stock of our resources, private and national. Many a farmer, tired and discouraged, has sold his farm and belongings, only to find out too late that he was richer than he thought he was, and that during the years which were to him so disappointing, a steady increase of stock and equipment had taken place which he had not properly been aware of.

So for a few moments let us glance over our national assets. First, let us remember our heritage—our citizenship in the British Empire, the great commonwealth, the great League of Nation, if you will! Even the spiritually-minded Paul was proud of his citizenship in the Roman Empire and could assert with just dignity, 'But I was free born!' Not with banal pride, but with humble thankfulness, let us remember that we are free born.

Next let us take note of our place on earth, geographically, as regards neighbours. I think everyone of us can recall localities and neighbourhoods where we would willingly care to live. Like Britain, on all sides save one, we are surrounded by the inviolate sea, and on the remaining southern border, we have the greatest Republic of all time, a vast aggregation of wealth, widespread high-powered industrial development and a standard of living, educational equipment and general well being which is the high mark of the ages. With this great neighbour, kindred in many ways, we are well entered on the second hundred years of peace. To realize what this environment means is to feel a fresh surge of confidence and thanksgiving.

Climatically, our advantages will be more and more appreciated and the discomforts of our frost bitten, snow bound periods more and more minimized. The balmy and luxurious south has lately demonstrated that serious disadvantages go with tropical temperatures.

Now to more specific resources—long before the morning sun has gilded the lovely shores of Cape Breton, his beams have revealed many a fishing boat far out to sea, gathering the perennial harvest of fishes, great and small. From Labrador all around the Gulf of the St. Lawrence, and the cove indented shores of Prince Edward Island, Nova Scotia and New Brunswick—cod, salmon, mackerel, haddock, herring, halibut, abound also the familiar sardine and lobster of doubtful delight.

Miles under the sea, the Sydney coal mines extend and the forges of the British Empire Steel Company turn out the basic steel and iron needed so universally in our industries.

All through the Maritimes, lumbering, mixed farming, fruit growing and fishing, and recently fox farming have been fair fields for honest livelihood. Quebec and Ontario, the great central provinces, are generous rivals in agriculture, manufacturing, lumbering and mining. In the childhood days of many of us, California, Australia, South Africa, were the distant lands of gold, but now in twenty-four hours we can visit the greatest gold mines of the world. Who would think that in the matter of fur production our dear old Ontario leads the Dominion, and also in mineral production, live stock and developed water powers, second only to Saskatchewan in field crops, and to Quebec in commercial timber.

Of our Western Provinces, I need not speak; the world is coming to regard them as serious factors in furnishing the universal staff of life. As a scenic playground, the Pacific Coast and Rocky Mountains of British Columbia are coming to their own and as we began on the east, we will finish on the west, with a glimpse of the home-coming fleet of fishermen who add to the tale of Canadian

industries—the juicy salmon—beloved, alas, by too many sandwich makers.

To begin to enumerate specifically Canadian industries would be an impossible task. I might suggest, however, that this beautiful and luxurious hotel could be built, equipped and furnished from bottom to top by the product of Canadian firms. As you scan your evening paper, reflect that within a mile of our meeting place, it was produced from Canadian materials. A visit to the Booth and Eddy plants would be an eyeopener.

As you journey to your homes by train, remember the vast transportation industry and think with pride of the two great railways of Canada, the greatest in the world, organized and managed by Canadian skill and genius and carried on by Canadian enterprise.

I was delighted recently to make a trip to the unostentatious town of Perth. There I saw the great Wampole works, whence medicinal and toilet preparations go all over the earth. I saw a factory turning out great quantities of ladies' fine footwear, another specializing in fine wearing clothes, and another in woollen wear—stockings and felt goods. All these add stability, independence and completeness to the structure of Canadian industry.

One other industry I might mention, the growing of fine boys and girls, the finest in the world. Too many, we often think, are added to our export trade to the south, but in this case—

"'Tis better to have loved and lost,
Than never to have loved at all.'

They go as missionaries of goodwill and fraternal ties, but we will all rejoice in the day when our country will provide an attractive field for their energy and ambition.

We cannot forget that farming is still the backbone of Canada.

'Year by year the farmer tramps it,
For a thousand miles or more,
In the wake of plough and harrow,
In haymow and threshing floor.
He milks the cows at early dawn,
To fill the factory can;
And the agricultural exports show
He's a very busy man.'

Coming as most of us do from farm homes, let us with renewed faith, hope and love do our part, small though it may seem, in adding to the ever increasing store of Canadian wealth, Canadian patriotism and international concord and goodwill."

A VARIETY OF ACTIVITIES

A County Musical Festival

The prominent place held by music in the hearts of the rural people of one county was recognized at a musical festival where several Women's Institutes, Community Clubs, orchestras, and choirs co-operated with the Agricultural Representative in staging the festival.

The competition had been put on a community basis. The various communities of the county had been divided into groups according to their size. The

smaller communities were asked to present two numbers each, the larger communities three numbers each, and the villages four numbers each. The selection of these numbers was left to the community putting them on. One number from each community had to be a group number, either chorus or orchestra, the remaining numbers were usually quartettes, instrumental trios, and a solo selection, either instrumental or vocal. A score card had been prepared to assist the judge in his work. In the communities presenting three numbers each, there was a possible score of fifty points in case the group number was an orchestra, and forty-five points in case the group number was a chorus. It was felt that the orchestra should have some advantage over a chorus on account of the greater difficulty in developing orchestral talent. A possible score of thirty points was allowed for instrumental or vocal quartettes or trios, and a possible score of twenty points was allowed for instrumental or vocal solos or duets. Thus the emphasis was placed on community singing and orchestral work rather than solos and duets, at the same time it was recognized that a community possessing a good soloist should get consideration. The possible score in each of these three numbers was divided over the usual points—tone, attack and time, interpretation and selection. The score card worked out very satisfactorily, the decisions being very acceptable in both groups.

A great deal more interest was taken in the festival than was anticipated. Very little advertising was done, as the competition was to be held in a hall seating only about 450 people. Six hundred crowded into it on Friday night and some were turned away. Over 200 contestants took part, and these were given seats at the front of the hall. They might have been kept out of the hall and appeared only for their two or three numbers, but this would have defeated half the purpose of the festival, which was to show many communities what others were doing and what could be done in choral and orchestral work. All the contestants were from small rural communities and practically all were engaged in farming. The proceeds from the sale of tickets was divided evenly between the nine communities represented with the specification that the money be used for the purchase of music or for securing the services of a musical director.

The counties which have undertaken work of this nature are Bruce, Elgin, Grenville, Middlesex and Wellington.

May Musical Festival

A member who is a trained musician undertook the leadership. Choruses were selected and copies sent each branch to practice separately until just before the final, when two general practises were held. Each branch in the district was requested to provide two numbers on the programme. The senior school students were asked to unite with the chorus voices for the opening number, "O, Canada." The stage was decorated with spring flowers. The affair was not competitive. The choruses of one hundred voices did credit to the county and to the Women's Institute. After deducting expenses of the festival, the proceeds were given to the general funds of the district.

A Girls' Sport Club

The girls of the club are Junior Members of the Women's Institute, but are allowed the use of their membership fees for their own activities. They have a president and secretary-treasurer. They do not have monthly meetings, but attend our monthly meetings. If we arrange to have a banquet or literary

programme, they always help us out. They play tennis and ball in the park, which the Seniors hepled to provide for their recreation.

A Play

We tried putting on a play, writes one branch, partly to make some money for the Institute and also to give some enjoyment to the young folk who took part in it. The name of the play was "My Wild Irish Rose;" it is a three-act play with twelve characters, six boys and six girls. It lasts for two and one-half hours. We commenced to practise in October and we put it on on December 10, and again in January, and again in February. Practice makes perfect, for the last time the actors were greatly improved on the first time. One of our members was experienced in this line of work and we went from house to house practising and training them, sometimes for nights in succession. The young people enjoyed it immensely.

The boys in connection with the play all belonged to the hockey team, and as they were just trying to organize at that time and also to get a skating rink, we promised to help them out with their problems if they would help us with the play. So they did, and, as we promised, we handed them the proceeds of one entertainment, and it was very gratifying to see how the boys helped us as doorkeepers, arranging the stage, scenes, etc. It was a pleasure to see everyone working together in such harmony.

Everyone knows that men are very handy things to have around. Now some of our men are just splendid to help us at our socials and the like. There are, however, some who are indifferent and think that Institute work does not amount to much and does not interest them anyway, but we all know that they like a good time with lots to eat, so we decided to try to interest them in our work by holding a few sociable evenings for the community.

Grandmother's Day has been an annual event with us for several years, and one of our members conceived the idea of sending special invitations to the grandfathers of the community for a Grandfathers' Evening.

Each family provided something towards the lunch, something for the programme of old time songs, readings, recitations and music. A few who were not used to speaking from the platform got stage fright, but they persevered and soon gained more confidence in themselves and will not be so timid the next time. We gave a prize to the oldest grandfather and one to the youngest, but this could be varied as, for instance, the tallest and the shortest, the heaviest and the lightest, the one with the most grandchildren and the one with the least. The grandfathers thanked the Institute for the gifts, and the oldest grandfather, who was considerably over seventy, said the evening's entertainment revived old memories of the good times he had had when younger in the same hall where we were gathered. After a bountiful lunch had been enjoyed, one of our old-time fiddlers gave us excellent music and those who cared for dancing enjoyed themselves in the old-fashioned square dances, our oldest grandfather often putting us right when we made mistakes. Those who did not care to dance enjoyed a sociable chat, and we really seemed like one huge family. All present were agreed in thinking that our Institute had done a good thing in bringing the neighbours together, some of whom would not have otherwise met during the whole winter.

Everyone Boost and Everyone Work

We held a meeting each month in some form or other. In July it was a monster garden party which was the main source of revenue for the year. It

is needless for me to tell just how this was organized and conducted for everyone knows that to give a garden party means—"EVERYONE BOOST AND EVERYONE WORK."

In November a Hallowe'en party was given and all the men were invited. A committee was appointed to look after details. They rented a hall and decorated it suitably and sent invitations to all the members and their families. A fine was imposed on all who were not in costume. Then there was the grand parade and prizes were given. A lunch was served to which all contributed.

The last of a series of three oratorical contests among the three schools represented in our branch of the Institute was held in the evening in the church, one pupil from each school competing. Three disinterested judges were obtained from nearby towns and music and readings were interspersed to enliven the evening. A silver collection was taken to defray expenses. The school obtaining first prize received a phonograph, while the other schools were awarded pictures. But it was so arranged that should one school receive first prize more than once that school would get the honour but the phonograph would go to the next in place, or to the school without one. Thus, all three schools are well equipped with beautiful pictures and with music as well.

AN ALERT NEIGHBOURHOOD

The *home* is the best recreation ground and to provide entertainment of an interesting nature may require a great deal of thought on the part of the parents and others. Here is an instance of what one neighbourhood did for their young folks. After the advent of the car they became alarmed about the young folks' welfare. They were only ten miles from town, so it was quite a simple matter for the young folks to go to town for amusement. But the leaders resolved to entertain them at home. The Anglicans and Methodists united and organized a community club with the school teacher as leader. The fee was ten cents, meetings were held fortnightly, and all from six to sixty years of age attended. Out of this has arisen a male sextette, a glee club, a boys' chorus, and a debating club, and in connection with the church a Young People's League and outdoor sports for summertime.

THE INSTITUTE PROGRAMME

ORGANIZED FOR SERVICE

A Western Ontario branch says:—Our board of directors consists of the president, vice-presidents, secretary, and the branch directors. The flower conveners take charge of the collection taken at every meeting and send fruit or flowers, using their own judgment, to the sick and shut-ins in our community. We try to give to the living, also to our own Institute members' families when in bereavement. The work conveners get in touch with the head of the different institutions and bring before the meetings what they think our branch can do, and we discuss and offer suggestions, and if needed ask for volunteers, or the convener asks someone to help to carry out what is to be done; perhaps form a commitee. In this way each member has some special work and every one feels herself a part of the branch.

This year instead of the hostess serving the refreshments, we have a lunch convener and she asks four ladies in turn, thus passing around to all the members the duty to serve at one meeting. We think this is a great improvement.

We are a small, scattered branch with only one school to work for and the community, so we divided our year up into six parts and take two months to work for each charitable and public institution in our community and home city. It seemed very successful, bringing help and cheer to many and we emjoyed it ourselves. For example, we sold roses on Rose Day for the hospital and gave glasses to the maternity ward where we heard they used granite cups.

To the Home for the Aged and Infirm, we paid a visit, put on a programme, served a picnic lunch to the inmates and donated old cotton for sickness.

To the Sanitorium we sent oranges.

To the Children's Shelter we made quilts and sent vegetables.

To the Widows' Home we donated fruit and brought the old ladies out for an afternoon and served tea. We donated money to the Travellers' Aid.

A Balanced Programme

An Eastern Ontario branch plans to have one or two instructive papers, one demonstration or exhibit, a chapter from the Handy Guide to Laws of Ontario, a roll call, some music, and a social half hour at each meeting. It publishes as news items in the local paper the minutes of meetings and things of interest, finding this to be good advertising.

How to Make Silent Members Talk

One branch selects two roll call captains who choose sides from the membership. Each member answering to her name with the required topic or quotation gets two marks. The roll is called at the beginning of the meeting, thus the lates do not get a chance to answer. At the end of the year the losers treat the winners to a supper. It is surprising how all try to be on time and have their responses, and how the silent members are stimulated to say something. It also brings promptitude in opening. This branch very sensibly adds: "If something crops up we don't like, we just live above it until it quiets down."

A Young Mothers' Group

A Junior Institute which one by one has graduated into married homemakers is making the unique experiment of carrying on together as the Junior Matrons or Young Mothers' Group of the local Institute, claiming that they still have problems somewhat different from those of the girls or senior members in the feeding, care, and training of babies and pre-school age children.

Programme Suggestions

DEMONSTRATIONS

Salad making—Two members brought materials and made the salads at meetings, hostess providing tea, bread and butter.

Garment Cutting—By a dressmaker, who brought material and explained the most economical method of placing the patterns on the goods.

Cleaning, pressing and *hanging away clothes* was another excellent demonstration.

Changing a patient's bed was given by a practical nurse.

A remodelled hat parade.

A home-made housedress parade.

Mat making
China mending
How to bone a fish
Correct table serving and setting
Home-made dish drainer
Illustrated talk on millinery
A day's balanced diet—3 meals
Salads for summer
Salads for winter
Garment cutting
Cleaning clothes
Reed weaving
Making shortbread
Making tufted spreads
Preparing baked beans
Stuffing and covering a chair
Cutting up hind quarter of beef
Carving a fowl
How to remove stains
Milk and its uses in the diet
Properly balanced school lunches
How to make a buttonhole
How to make a pocket
How to put in a sleeve
Planting of flowers
Pruning
Grafting and budding
Poultry culling
The invalid's tray

A demonstration lecture on music given by a music teacher consisted of six brief biographies of leading composers, a demonstration by her pupils of one of his compositions following each biography.

A local fire-marshal gave a talk, "Helpful Hints on Safety Regarding Gas, Electricity, Oil, Gasoline," and followed it by a demonstration of how to use chemical fire extinguishers.

The local doctor gave an illustrated talk on "What to do in Emergencies."

ROLL CALLS

A current event.
The work I like best.
Irish jokes.
Scottish jokes.
Household hints.
A conundrum.
Recipe for sauerkraut, pickles or sauces.
A salad recipe.
How to remove spots and stains.
A step and time-saving idea.
Something grandmother said or did.
Hints for housecleaning time.
Exchange of crochet, knitting or tatting patterns.
A potato recipe.
Don'ts.
Story of ancestors and pioneers of the county.
Amusements for small children.
Home remedies for burns, scalds, bruises and sunburn.
Sing—Say—Play or Pay.
A food containing the vitamines A, B and C.
My most amusing housecleaning incident.
Pickle recipe and sample.
Don'ts for the year.
A good idea for keeping children employed.
New uses for old clothes.
A book I have recently enjoyed.
Cooking suggestions for busy days

Gems of thought.
A vegetable and its medicinal value.
Beautifying hints.
A simple remedy that every woman should know how to use.
How to prevent infection from colds or influenza.
My favourite vegetable and how to prepare it.
A favourite apple recipe.
A remedy for colds, burns or poison.
Ideals and ideas for Christmas.
Recipe for a wholesome summer beverage.
A use for waste paper, rags, or old stockings.
An exhibit of an inexpensive Christmas gift.
Ways of helping children form habits of health and courtesy.
A golden deed recalled.
A suggestion for the bride's hope chest.

SPECIAL DAYS

Apple Day.
Girls' Day.
Grandmothers' Day.
Grandfathers' Social.
Young Mothers' Day.
Annual Meeting with School Children.

Babies' Day, with address from nurse and prizes of a spoon each to the three babies nearest the correct weight for their age.

Health Day, with Doctor's address, and contest, "Study Thy Body and Know Thyself."

SOCIAL

Contests—Book Contest—Each member dresses to represent a book.
Study Thy Body and Know Thyself—Contest.
Spelling Match.
An Occupation—naming match.

EXHIBITS

Cookery with recipes attached.
Ways of serving eggs.
What can be done with apples.
Uses for potatoes.
What can be made from flour sacks.
A relic of Grandmothers' Day.
Dried and artificial flowers for home decoration.
A well-balanced winter dinner.
Well-balanced school lunches.
Bouquets of home-grown flowers.
Articles made with ten cents and a flour bag.
Pioneer antiques.
An exchange of bulbs, seeds, plants and slips.
An exchange of vegetable and flower seeds.
Work of the Garment-making Club.
Work of the Men's and Boys' Manual Training Class.

HOW THE BRANCHES REPLENISH THEIR TREASURY

Money Raising Through Social Development

The Institute view is that money raising is a very secondary interest in a sound home-making programme, and funds should come by methods which leave the community not only socially happy, but physically and intellectually better.

In one branch which divided its membership energies into groups, group 1 held a concert and debate which yielded thirty dollars. Group 2 realized fifty-four dollars through an oratorical contest for the children of their six schools. Each school sent not only a pupil contestant for the speech making, but others who sang, recited, or did folk dancing, a combination which provided a most interesting programme for the Seniors as well as encouragement of talent for the Juniors.

An Apron Tea

An especially interesting and enjoyable event was an Apron Tea. Invitations were sent out to the ladies of the community and a little apron enclosed for the fee—a copper for each inch of one's waist measure. A short programme was provided and a dainty tea served at the close.

Exhibits

Exhibit—contest of things made from flour sacks. Each member was to bring something useful made from a sack. A number of articles beautiful as well as useful were shown, and many useful hints could be taken from the exhibit of aprons, underclothing, bed spreads, pillow cases, table cloths, children's clothes (some dyed), laundry bags, clothes pin bags, and other things in this excellent display.

A variation of this is an exhibit of articles made from a yard of cotton, donated by each member and sold to replenish the Institute treasury at the close.

Girls' Quilt Making Contest

To encourage skill in sewing among the girls, one branch gave a prize for the best quilt block made by any girl under twenty years of age in the community, specifying the colour to be used. The Institute then had the quilt put together and quilted, when it was sold by public auction at a gathering in the hall.

Good Moving Picture Shows Make Money

One branch gave a moving picture show which cleared a goodly sum. The pictures were of local streets and pedestrians. Some of the scenes were taken at one of the cottages located on Rideau Lakes at a time when some Kiwanians were staying at the lodge. Their pranks and escapades were many and funny, and made excellent pictures well worth seeing. The use of machine and films was donated by an old-time resident of Newboro, who owns Kiwanis Lodge and whose wife is a member of the branch and a very great help in assisting in money-making schemes. At another time seventy Kiwanis gave a splendid concert which yielded well.

Other Methods

1. Lecture series on Public Questions of interest.
2. An afternoon or evening of winter athletics followed by a supper.
3. A conversazione.
4. Debates, plays and concerts.
5. Banquets for lodges and other organizations.
6. An Art loan week.
7. Pageants—Flower festivals.
8. Talent money.
9. Birthday age donations.
10. A housekeeper's bazaar.
11. An autograph quilt.
12. Apron judging (by putting a cent or nickel in the pocket of the favourite apron).
13. A mile of pennies.
14. Socials and garden parties.
15. A choral class or old-time singing school followed by a concert.

REMODELLING OF FARM HOUSES COMPETITION

With a view to encourage the remodelling and improvement of farm houses, prizes were offered for the best plans (drawings), photographs and descriptions of improvements which had been made in farm houses, by which convenience, beauty, healthfulness, efficiency, comfort, etc., had been secured.

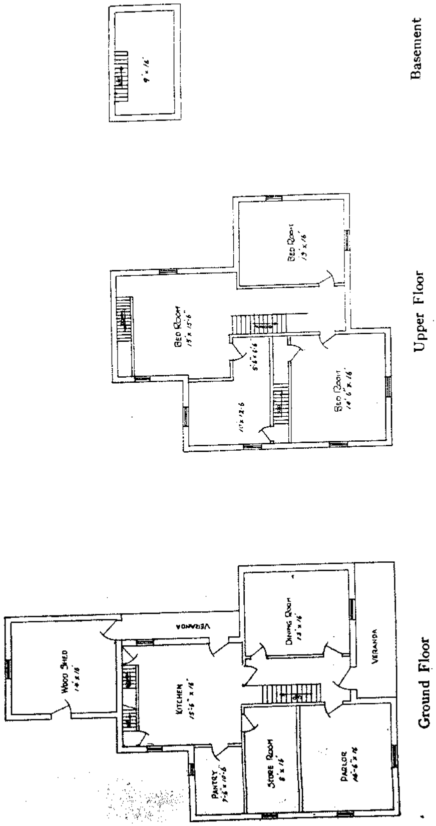
The original building, the cost of additions, alterations and improvements, and the results of the expenditure incurred, were considered by the judges. The clearness of the descriptions given, the exactness of the drawings and clearness of photographs were taken into account in awarding prizes.

While the number of competitors was not very large, many sections of the province were represented among the competitors. The five plans and descriptions which were considered the best were furnished by the following competitors: Mrs. M. R. Faris, R.R. No. 1, Bradford; Mrs. Margaret George, R.R. No. 1, Troy; Mrs. Ingram Cross, Chesterville; Mrs. L. J. Ketcheson, R.R. No. 1, Foxborough; Mrs. J. F. Schultz, Box 365, Brantford. The judges did not award first and second places, but simply chose the five best plans, and each of these was given a prize of $50.00, donated by the Robt. Simpson Co., Toronto.

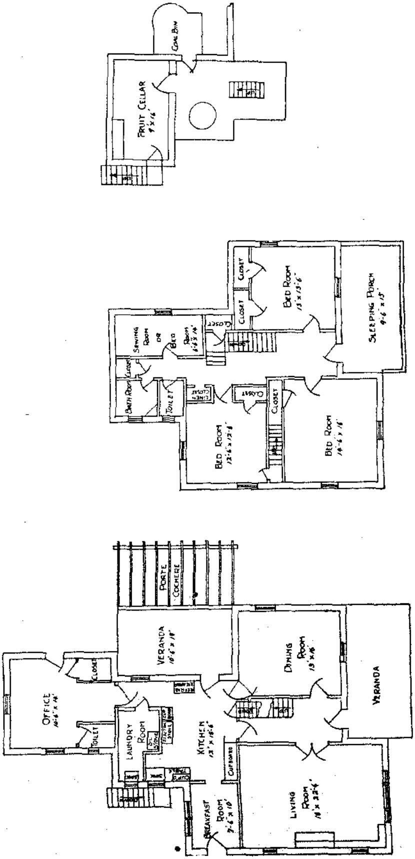
Below will be found cuts representing three types of houses with plans showing original house and the alterations made, and other plans indicating suggested improvements.

Plans "A-1" and "A-2" represent the house of Mrs. J. F. Schultz, of Brantford, who writes as follows:—

"Five years ago we bought what is now known as Spruceleigh Poultry Farm. The house, which was then some forty years old, was well built, but had no modern conveniences whatever, and there was one lone clothes closet under the attic stairs. The stair leading to the first floor was uncomfortably steep and altogether the house was anything but attractive. We saw the possibilities and proceeded to draw plans, utilizing the building as it was, but changing partitions, adding clothes closets, etc. No architect was employed and most of the work was done by Mr. Schultz and our three sons.



A1—PLAN OF ORIGINAL RESIDENCE



Basement

Upper Floor

Ground Floor

A2—Plan of Remodelled Residence

"The plans enclosed will give a better idea of the changes made than can be given in writing. We wired the whole house, installing an electric stove for cooking purposes and electric pumps for hard and soft water. The drinking water is pumped to a tank in the attic and the soft water comes from a compression tank in the cellar. We have coils in the furnace so that we are able to have hot and cold soft water on tap throughout the house.

"An additional excavation was made in the cellar for furnace, and the house is heated with hot air. An old cistern under the side verandah was utilized as a coal bin and a new cistern put at the rear of house. A good-sized cupboard was put in the cellar for fruit, also bins for vegetables. A stone wall separated furnace from fruit room.

"A new chimney was built with two flues, one for fire-place, the other for furnace, and is provided with openings at the base for cleaning out. An outside entrance to cellar makes it convenient for carrying out ashes, also bringing in vegetables for winter, etc.

"There is a bathroom with shower, basin and medicine cupboard on the first floor, also separate toilet. Basin and toilet were also placed in office.

"In the kitchen there is a sink, refrigerator, cupboards for pans, dishes, food stuffs, spices, etc., bins for sugar, bread, flour and pastry flour, drawers for towels, dusters, kitchen cutlery, etc., two tin-lined drawers, one for bread, the other for cake, etc. A kitchen table with enamelled top was placed in the centre of the room.

"The laundry room is fitted with laundry sink, hot and cold soft water and hard water. A coal oil stove is used for boiling clothes.

"The former woodshed was made into an office. This was floored, lined with gyproc and panelled. Two corners were enclosed, one for toilet and the other for the men's working clothes.

"The partition dividing parlor from store room was removed, making a splendid sized room and lending itself beautifully for living room decorations and suitable furniture. A fire-place was built with rug brick and two casement windows cut in on either side of the mantel and at about the same level. Book cases were built in, running from the fireplace to the large window at the front. This window was enlarged to a double mullion, over which an awning is hung in the summer. There are double French doors between the hall and living room.

"We found we could make a very convenient and desirable breakfast room from what had formerly been the pantry. A long window overlooking the garden was added, also an outside door.

"A swing door was put in between kitchen and dining-room, giving much easier access. A French door replaced the solid door leading to the hall. Three-eighths inch floors were laid in both halls, dining-room, living-room and one bedroom.

"The stair was built on the opposite side of the hall, starts farther back from the front door than it did originally, and is broken by a landing. There was space off this landing for a closet, which is used mainly for overcoats. The stair treads and handrail were stained mahogany and varnished. The risers and spindles were enamelled white.

"The front verandah, which was very narrow, was replaced with a new one ten feet wide with sleeping porch above, accommodating four single beds. The side verandah was also replaced, now being eleven feet wide, with provision

"A porte-cochere was built covering the driveway between the side verandah and pump house.

"A septic tank takes care of the sewage.

"The alterations cost approximately $3,000."

The following comments by Mr. Geo. White, of the Provincial Department of Public Works, will be helpful to those who are considering improvements in their houses:—

"The original house, 'A-1,' lent itself to many possibilities of remodelling. The scheme which has been carried out is very complete in every respect.

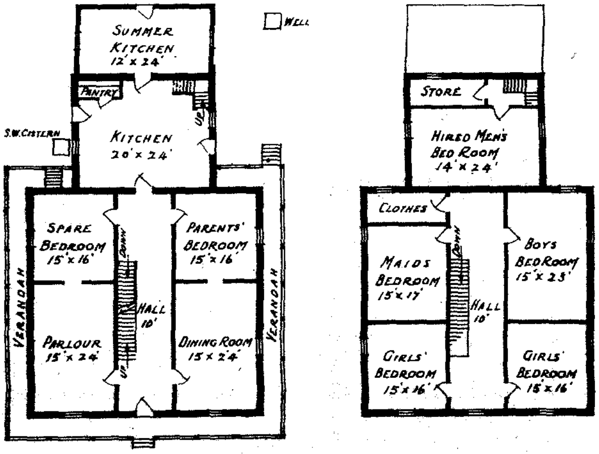
"Every modern convenience and labour-saving device has been introduced. The cost of the alterations is fairly moderate, considering the amount of work done.

"There are, however, one or two points in the planning which might have improved this otherwise excellent scheme. It is felt that the stair landing might have been better lighted by the introduction of a window at the half-landing, even at the expense of the closet on the half-landing; or a window over the top of the closet could have been introduced with a long, sloping stooling.

"The bathroom is small for a house of this type, and it would have been better to have taken in part of the upper hallway.

"The toilet, off the office, would be improved by having the door on the other partition wall, for greater privacy in the office, and also to provide additional space for furniture near the window.

"The exterior has been made much more pleasing by planting and keeping of the grounds surrounding the house in good order."



Ground Floor Upper Floor

B1—Plan of Original House

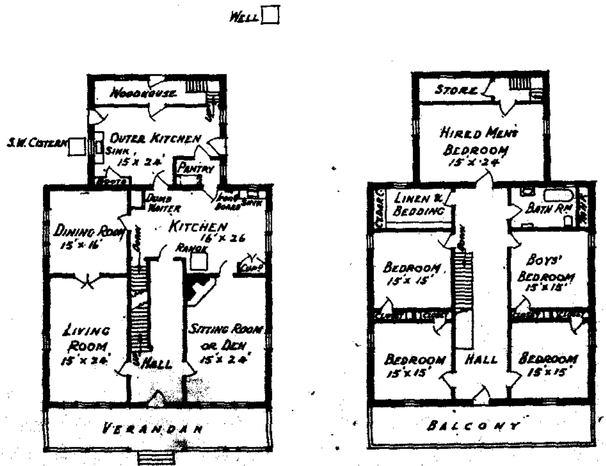
Plans marked "B-1," "B-2," and "B-3," represent the house of Mrs. M. R. Faris, of Bradford.

The comments of "Junia," of the *Farmer's Advocate*, on these plans will be of value to those contemplating the remodelling of their houses:—

"The plans embody many points worthy of comment and discussion. Especially interesting to my mind is the additional plan in which those responsible for judging the contest have suggested still further improvements. This emphasizes once more a point we cannot too greatly stress. When we build, or when we remodel, we should consult an expert before we come to any final decision as to the method.

"Note, for instance, the fireplace, which is actually placed so that the kitchen door opens immediately on to the hearth. Imagine the family gathered there. Then place the fireplace as in the modified plan, with the door in the opposite corner and a long wall between it and the hearth. Even in imagination there is at once a feeling of added comfort and charm about the latter arrangement, especially if we imagine ourselves entering from the hall door. Then the fire will be diagonally across the room to flash a welcome, instead of almost out of sight down the same side of the room. It may be that architectural details of chimneys and so on decided where the fireplace should actually go, but it is a detail we cannot consider too carefully.

"Then follow out the changes. In the kitchen the range moves over nearer the window, the sink and cupboard go below and beside the window. On the upper floor the big room at the back is made into two, so that if there are two men employed each may have a room, or one of them may serve as a guest room,

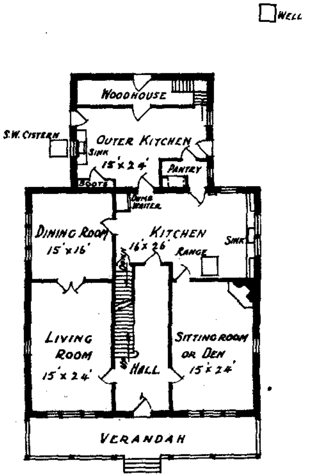


Ground Floor Upper Floor

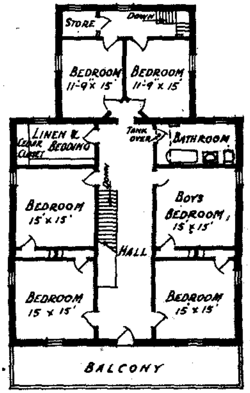
B2—Plan of House as Remodelled

or in case of illness would give a room easily isolated. The modifications in the bathroom give more space and also bring the fittings along the inside wall, where there will be practically no danger of frost.

"Considering the plan submitted by Mrs. Faris, we find so much that is praiseworthy that we hardly know where to begin to comment. The improvements include plumbing with water supply and a soft water pump in the outer kitchen; heating by hot air; a new chimney; hardwood floors downstairs; and structural alterations; and the total cost was $1,200.00. While it does not show in the plans, the remodelling is to include the addition of trees and shrubs to make more beautiful the setting for the new-old house. Architecturally the outside of the house has been changed by taking down one of the narrow, all-round verandahs and substituting one of cement blocks across the front only,



Ground Floor



Upper Floor

B3—MODIFICATION ON REMODELLED PLAN

with a balcony above. The woodshed at the back was also discarded. The first change one notices inside is the curtailing of the long, narrow hall. This gives more room in the new kitchen and adds immensely to the hospitable feeling one receives on entering. The dining-room has retired to a companionable position next the kitchen, and think of the countless journeys that will be saved thereby. Notice especially the windows that have been widened to change what was a rather dark house into a very light one. On one point we would like to give special praise to Mrs. Faris. While the small panes of the old windows would not provide glass for the large new ones, these panes were kept and

used across the top and down the sides, giving a charming touch and serving also to keep the modern windows in harmony with the house.

"Upstairs the bathroom will arouse the envy of many hearts and the clothes closets are things to covet also. The one closet of the old plan becomes a linen cupboard in the new. The cedar chest built in at one end of this cupboard is especially commendable. It is moth proof and will earn its cost over and over again in protecting the family furs and woollens.

"The remodelled house has so many small features that do not show on the floor plans. For instance, the inside of each closet door in the bedrooms has a rack for hosiery and another for shoes. In the kitchen there is a dumb waiter, an ironing board built in and ample cupboard and pantry space. There is a drawer cabinet in the pantry which pulls from either side, so that one has access to it from the kitchen or the pantry. There is purposely no kitchen entrance to encourage visitors to walk in on one's busiest moments.

"There is a rare charm and dignity about countless old Canadian farm homes. Yet one must admit that many of them fail in matters of convenience and interior arrangement. It is a tragedy when the old house is ruthlessly torn down to make way for a less lovely, but more convenient modern structure. Why cannot we preserve the beautiful old homes and remodel them for added comfort? Let us think, not twice but a thousand times, before we demolish the old homes of stone or timber or brick. Home-keeping Canadians do not realize how the beauty of our country and the charm of our old homes impress those from other lands. Let us keep the fine architectural traditions of the simple old homes, while adding every convenience and comfort we can contrive."

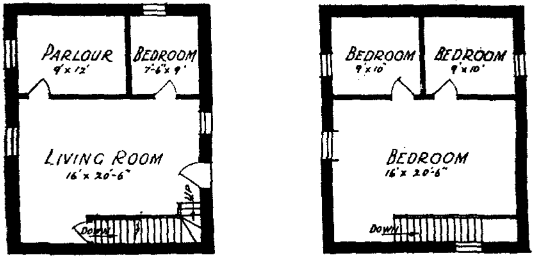
The accompanying plans, "C-1" and "C-2," were entered by Mrs. Margaret George, R.R. No. 1, Troy, Ont., and won a prize. These plans give apt suggestions for remodelling a small house.

The original house was built of stone, and stone houses do not usually lend themselves to easy remodelling. The main large room of the house served as kitchen and living room, with a small parlour and a bedroom occupying the remainder of the ground floor. It is not difficult to imagine the improvement made by taking out the partition between the parlour and bedroom, converting the large room thus made into a kitchen, and moving the stairway over to the centre of the house where it would provide a convenient place for a cellar stairway opening into the kitchen. With the stairs moved from the corner of the house, space was left for an outside door and a broad "grouped" window, adding immeasurably to the cheerfulness of the large room now furnished and used as a living room proper. Mrs. George showed good building economy in retaining two doorways and the main partition wall in their original positions, and in making use of the little space at the end of the cellar stairs as a built-in cupboard.

Changing the position of the stairway made possible a vast improvement in the arrangement of the rooms upstairs. Instead of having to pass through the bedroom to reach either of the others, there is now a privacy of approach from the stairway to every room on the floor. The unnecessarily large room, sixteen feet by twenty feet six inches, now makes two bedrooms with a door opening between, since one is used as a child's room. Where there was not a clothes room in the house before, there is now one in connection with each of the main bedrooms. Best of all, a complete bathroom has been installed with a pressure water system, a sink in the kitchen with hot and cold soft water and a hard water pump, a pipeless furnace and electric lighting. Mrs. George estimates the entire cost of these improvements, and the remodelling of the house itself, about nine hundred dollars ($900), although she finds it difficult

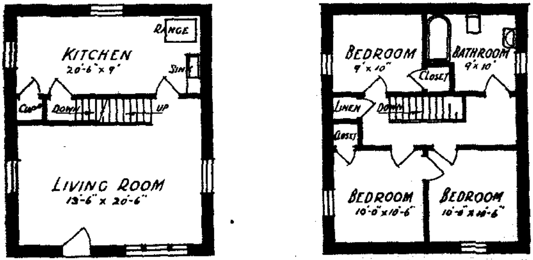
to arrive at an exact figure, as they had their own lumber and helped with some of the work. This amount would not, of course, include an electric plant; they must have already had that or some other source of electricity for lights. Viewing the old house and the new, we feel that this was an exceedingly good investment.

Plan "C-3" outlines suggestions for further improvement.

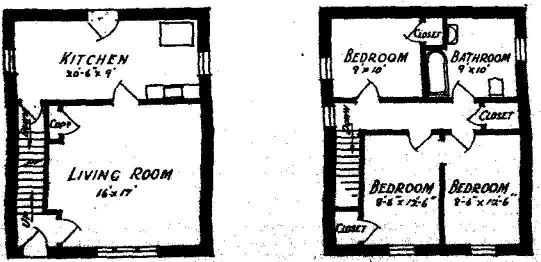


Ground Floor Upper Floor

C1—Plan of Original House



C2—Plan of House as Remodelled



C3—Modifications on Remodelled Plan

THE FEDERATED WOMEN'S INSTITUTES OF ONTARIO

The following extracts are taken from a letter addressed to the Institutes by the officers of the Provincial Federation:

"We trust that every district will consider the possibility of extending the work to new centres. Both branch and district officers should be active in this regard, as well as giving assistance to the branches needing help from outside. We trust that every branch makes an effort to exchange visits with a nearby branch. If this is impossible, we would suggest regular correspondence with some other branches. Neighbourliness between Institutes has a most wholesome effect.

"Following the splendid conventions, and the encouraging reports of effective work that are continually coming to hand, we are pleased to report that the Institutes in general are carrying on effectively in a variety of ways. It is a matter of general satisfaction to know that on the Thirtieth Anniversary of the establishment of the Stoney Creek Women's Institute, the members showed much enthusiasm and reported ever-growing effectiveness in their work. The adaption of the Institute organization to meet all requirements and the readiness of the members to give of their best for the general welfare, insures continuous development and advancement in the work.

"During my presidency, since the fall of 1924, I have visited many sections of the Province, and after surveying the general situation would suggest that among the urgent needs are, first, to work more closely with the schools and school boards with a view to beautifying the schools and improving their sanitation and use our influence to secure and retain the services of the best teachers for the rural schools. To show interest in the pupils by having one or more of the members visit the school and give a brief address bearing upon the significance of the holiday that is being celebrated. Second, closer co-operation with the local fairs throughout the Province. The Institutes can, through co-operation, make these of greater interest and value to women and children. Third, adequate assistance to the mothers at times when they need special advice, assistance and medical and nursing service. Fourth, we cannot but conclude that it is through lack of knowledge as to the value of the Demonstration Lecture Courses that a branch fails from year to year to take advantage of this splendid service given so generously by the Government. If your Branch has not yet had this splendid service, we would suggest that you write the Institutes Branch for particulars and arrange for a course at an early date.

"The more familiar we become with the variety of services being rendered by the Institutes Branch of the Department of Agriculture and the readiness with which they co-operate with the Institutes in carrying on their regular work, the Summer Series of Meetings and the Conventions, the deeper our appreciation of this co-operation.

"The Provincial directors are being kept in touch with the work in general; but it would be well for those branches which have something of particular worth to send it on to the director for her subdivision, who will in turn utilize it when attending district annuals.

"Your directors are being kept in touch with the work, and are lending assistance where possible in the subdivisions they represent and are each doing their part to make the convention for the area in which they are located of the greatest value.

"Some of the more important matters dealt with at the meetings of the Board of Directors throughout the year are briefly reported below.

April, 1926

"That the Adolescent School Act should be more rigidly enforced.

"Requesting the Institutes to report direct to the Board of Censors, when pictures of an undesirable character are presented, and recommend that good pictures be shown.

"That the members of the Institutes use every opportunity to inform themselves as to the activities of the League of Nations and to co-operate in every possible way to further the objects of that organization.

"Expressing the desire for a more adequate medical service in the more remote portions of the Province.

"Requesting that hydro rates be equalized so that the residents of the rural district may secure electricity at a lower cost.

"Asking for a more liberal financial assistance to the northern districts in carrying on their Institute work.

November, 1926

"That a committee of five be appointed to co-operate with the Provincial Department of Health, the Ontario Medical Association and Medical Schools with a view to securing adequate service in the isolated communities.

"That additional funds may be donated by the Department of Agriculture for extending the work in Northern Ontario.

"That consideration be given to the appointment of Home Demonstrators or women county agents, to give to the women and girls of rural Ontario the service corresponding to that which the Agricultural Representatives give to the farmers.

"A committee was appointed to co-operate with the Provincial Council of Women.

"A large number of other matters were dealt with by the Board, but these have been brought to the attention of the Institutes by some other means, and we do not wish to make this letter unduly lengthy. Representatives to other organizations were appointed as follows:

"Home and School Association: Miss K. F. MacIntosh, Brampton.

"Social Service: Dr. Margaret Patterson, 97 Walmer Road, Toronto; Miss E. Appelbe, R.R. 2, Georgetown.

"Red Cross: Mrs. Wm. Todd, Orillia.

"Women's Prohibition Association: Mrs. S. Banks, Shelburne.

"Navy League: Mrs. C. Field Robertson, Lanark.

"U.F.W.O.: Mrs. Geo. Edwards, Komoka; and Mrs. Chas. Macoun, R.R. 4, Campbellford.

"Royal Winter Fair: Mrs. C. Field Robertson, Lanark; and Mrs. Geo. Edwards, Komoka.

"Canadian National Exhibition: Mrs. C. Field Robertson, Lanark.

"Dominion Federation: Mrs. C. Field Robertson, Lanark, and Mrs. R. S. Woods, 60 Pearl Street, Brockville.

"These representatives bring to the Institutes information regarding the organizations concerned, which in many sections is of value to the Institutes; and, on the other hand, the representatives have an opportunity of placing before the organizations and societies named up-to-date information as to the activities and aims of the Institutes.

"The officers of the Federation will always be pleased to consider any suggestions or resolutions which you may have to submit.

"It is gratifying to note that the contributions have been more liberal and general in support of the Federation during the past year. This liberality has enabled the Federation to make more effective its co-operation in the general work of the Institutes and in giving assistance at the various conventions, as well as to devote some additional funds to the work of the Standing Committees. We look with confidence to generous contributions during the coming months and upon this basis the activites of the Standing Committees will be encouraged and assisted. If each branch would remit 15 cents on account of each member for the current year, as a great many of the branches are now doing, the financing of the Federation would be an easy task.

"Each branch secretary is requested to pay the contribution of her branch to the district secretary before, or at the time of, the district annual. Then the district secretary will forward the total contribution from the district to the treasurer of the Federation. The treasurer, who is also corresponding secretary, will gladly give any desired information.

"The financial statement for the year, November 1st, 1925, to October 31st, 1926, is given herewith:

Receipts

November 1st, 1925, Balance on hand	$1,289 00	
Fees received during the year	2,862 24	
Interest and exchange	33 04	
		$4,184 28

Expenses

Transportation expenses of Federation representatives in attending conventions, 1925:		
London	$96 15	
Toronto	130 75	
Ottawa	53 90	
Fort Frances	37 60	
		318 40
Expenses of members of Board in attending conventions:		
London	$86 70	
Ottawa	51 00	
		137 70
Sundry convention expenses:		
London	$22 65	
Ottawa	38 70	
Toronto	35 90	
Belleville	3 30	
		100 55
Expenses of Directors in attending Board meetings:		
November, 1925	$347 65	
Easter, 1926	285 30	
		632 95
Expenses of Directors in attending District Annuals and special meetings		250 10
Expenses incurred by members of Board in representing:		
Institutes at other organizations		206 05
Meeting with the Dominion Executive		37 70
Postage	$78 19	
Stationery	58 65	
Exchange	25 60	
Royal Winter Fair Donation	50 00	
Board letter	52 45	

Flowers	$7 50	
Telephone	1 49	
Typing, auditing, etc	33 52	
Salary of Secretary-Treasurer	100 00	
Paid to Dominion Federation	500 00	
		$ 907 40
		$2,590 85
Balance on hand, September 30th, 1926		1,593 43
		$4,184 28

"The above letter has been approved by the Provincial Board of Directors, which has passed a resolution expressing the willingness of the Institutes to co-operate in whatever general plan is adopted to celebrate the Sixtieth Anniversary of Confederation.

(Signed) Carrie Field Robertson, *President.*
M. Macoun, *Secretary-Treasurer.*

FEDERATED WOMEN'S INSTITUTES OF ONTARIO

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	Mrs. Wm. Todd, Orillia.
	Mrs. Geo. Edwards, Komoka.
President	Mrs. C. Field Robertson, Lanark.
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Ontario Department of Agriculture

ANNUAL REPORT

OF THE

STATISTICS BRANCH

1926

PART I.—AGRICULTURAL STATISTICS
PART II.—CHATTEL MORTGAGES

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

ONTARIO

TORONTO
Printed by the Printer to the King's Most Excellent Majesty
1927

The United Press
Limited
Toronto
Canada

Ontario Department of Agriculture
Statistics Branch

PART I—AGRICULTURAL STATISTICS

THE WEATHER

TEMPERATURE.—The following table gives the temperature of the Province for each month during the last five years, together with the mean annual temperature, also the mean temperature for the six months, April-September, practically the growing season, together with the average for the five years, 1922-1926, and the forty-five years, 1882-1926.

Months	1926	1925	1924	1923	1922	1922–1926	1882–1926
	°	°	°	°	°	°	°
January	19.6	14.1	16.9	16.4	16.8	16.7	17.8
February	17.2	23.9	15.8	14.5	19.5	18.2	17.5
March	22.0	31.5	29.1	22.6	30.8	27.2	27.3
April	34.8	44.2	41.1	39.4	43.2	40.5	41.7
May	51.1	49.1	48.6	50.2	58.3	51.5	53.5
June	58.5	65.3	61.6	65.6	64.3	63.1	63.5
July	66.5	65.4	65.6	67.2	67.2	66.4	67.7
August	66.3	66.9	64.5	64.2	65.6	65.5	65.7
September	57.4	59.5	55.6	59.3	61.3	58.6	59.3
October	45.8	39.9	49.9	46.8	47.6	46.0	47.4
November	33.9	34.1	36.1	36.4	38.0	35.7	35.3
December	20.7	22.3	18.6	33.0	23.	23.6	23.5
Annual Mean	41.2	43.0	41.9	43.0	44.7	42.7	43.3
Mean for six months, April to September	55.8	58.4	56.2	57.7	60.0	57.6	58.6

The mean temperature for 1926 was 41.2 degrees, or 1.8 degree colder than the preceding year, and 2.1 degrees below the normal of the forty-five years, 1882-1926.

The mean of the six growing months, April-September, was 55.8 or 2.6 degrees below the preceding year, and 2.1 degrees colder than the forty-five year normal. January and August were the only months that were above average, January with 1.8 degree being the highest, while all the others were below, ranging from 0.3 in February to 6.9 in April.

SUNSHINE.—In the following the averages of sunshine are derived from the records of the weather stations at Woodstock, Toronto, Lindsay, Kingston and Ottawa.

Months	Sun above horizon	1926	1925	1924	1923	1922	1922–1926	1882–1926
	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.
January	285.7	55.5	81.5	66.0	70.9	109.4	76.7	77.4
February	291.4	94.4	86.4	125.5	104.3	100.4	102.2	104.2
March	369.9	166.4	128.7	134.4	139.4	162.6	146.3	145.6
April	406.4	178.5	225.1	183.3	181.8	181.3	190.0	181.9
May	461.1	262.6	189.4	192.0	271.5	236.0	230.3	214.3
June	465.7	249.4	268.3	241.8	255.6	228.5	248.7	248.5
July	470.9	282.1	251.6	289.4	270.4	298.8	278.5	268.5
August	434.5	187.1	274.4	252.0	265.9	256.0	247.1	240.3
September	376.3	137.1	136.3	157.3	166.5	218.0	163.0	183.5
October	340.2	112.1	116.6	204.9	159.4	160.8	150.7	139.7
November	286.9	60.5	90.2	91.2	72.7	60.7	75.1	78.0
December	274.3	66.3	58.6	59.6	58.7	78.8	64.4	62.5
For year	4,463.3	1,852.0	1,907.1	1,997.4	2,017.1	2,091.3	1,973.0	1,944.4
For six months, April to September	2,614.9	1,296.8	1,345.1	1,315.8	1,411.7	1,418.6	1,357.6	1,337.0

The year 1926 had 1,852.0 hours of sunshine, 92.4 hours less than the average for the last forty-five years. The six growing months, April-September, had 1,296.8 hours, or 40.2 hours less than average. Four months were above and eight below normal. May had the greatest departure above with 48.3 hours, and August the greatest below normal with 53.2 hours.

PRECIPITATION.—The fall of both rain and snow for the five winter months, including November, 1925, and March, 1926, is given in the following table for five years, together with the average for the forty-five years, 1882-1926. Ten inches of snow is equivalent to one inch of rain.

Months	1926	1925	1924	1923	1922	1922–1926	1882–1926
November, 1925:	in.	in.	in.	in.	in.	in.	in.
Rain	2.52	0.96	2.16	1.25	1.08	1.59	1.93
Snow	5.3	6.2	4.2	5.1	11.7	6.5	7.2
December, 1925:							
Rain	0.66	0.94	2.04	0.47	1.39	1.10	1.27
Snow	13.8	13.8	8.6	14.2	12.9	12.7	15.2
January, 1926:							
Rain	0.54	0.03	1.61	0.35	0.33	0.57	0.90
Snow	17.4	18.4	24.0	20.9	14.1	18.9	18.9
February:							
Rain	0.54	1.56	0.09	0.11	0.89	0.64	0.73
Snow	16.0	10.0	20.9	12.9	16.2	15.2	15.8
March:							
Rain	0.82	1.67	0.58	0.80	1.21	1.02	1.18
Snow	18.0	11.4	5.4	18.1	8.0	12.2	10.7
Five months:							
Rain	5.08	5.16	6.48	2.98	4.90	4.92	6.01
Snow	70.5	59.8	63.1	71.2	62.9	65.5	67.8

The total amount of rainfall for the five months was 5.08 inches, or 0.93 inch below the average of the forty-five years, 1882-1926.

The total amount of snowfall was 70.5 inches, or 2.7 inches above normal. February was slightly above, 0.2 inch, and March 7.3 inches, were the only months to exceed their averages, the rest all being below.

The rainfall for the six months, April-September, comprising what is regarded as the growing season for most crops, is given in the following table covering the last five years, 1922-1926, and the normal for the forty-five years, 1882-1926.

Months	1926	1925	1924	1923	1922	1922–1926	1882–1926
	in.	in.	in.	in.	in.	in.	in.
April	1.53	1.18	2.05	1.81	3.22	1.96	1.86
May	1.47	1.53	3.52	2.85	1.86	2.25	2.74
June	3.28	3.52	2.37	3.13	3.47	3.16	2.80
July	2.72	3.48	3.47	1.99	3.50	3.03	2.83
August	4.10	1.77	2.78	2.75	2.31	2.74	2.68
September	4.12	4.11	4.11	2.54	2.34	3.44	2.73
Total for six months	17.22	15.59	18.30	15.07	16.70	16.58	15.64

The rainfall for the six months, April-September, was 17.22 inches, or 1.63 inches more than the previous year, and in comparison with the forty-five years was 1.58 inches greater. Three months were below and three were above their respective normals, May, with 1.27 inches below, and August, with 1.42 inches above, had the greatest departures during the growing season.

STATISTICS OF FARM CROPS

Field Crops	Acres	Production	Bushels per acre	Market Value Total	Market Value Per acre
		bush.	bush.	$	$ c.
Fall Wheat	807,015	20,988,030	26.0	26,262,506	32.54
Spring Wheat	115,497	2,166,054	18.8	2,708,690	23.45
Oats	2,831,755	95,722,130	33.8	49,615,846	17.52
Barley	449,095	14,447,174	32.2	9,823,171	21.87
Peas	97,865	1,880,301	19.2	2,831,588	28.93
Beans	51,721	819,166	15.8	1,913,221	36.99
Rye	86,355	1,501,390	17.4	1,309,840	15.17
Buckwheat	234,870	4,975,192	21.2	3,830,695	16.31
Flax	7,712	75,736	9.8	148,149	19.21
Corn (in the ear)	179,325	10,329,439	57.6	5,529,069	30.83
Potatoes	153,468	16,496,290	107.5	18,627,771	121.38
Carrots	1,672	253,966	152.0	50,793	30.38
Mangels	34,009	13,548,484	398.0	2,709,697	79.68
Turnips	71,500	23,204,013	325.0	4,640,803	64.91
Sugar Beets	41,594	18,831,084	453.0	3,766,217	90.55
Mixed Grains	770,981	28,577,629	37.1	18,697,998	24.25
		Tons	Tons		
Corn (for silo), green	367,772	3,497,071	9.51	15,736,820	42.79
Hay and Clover	2,889,143	4,248,048	1.47	54,154,454	18.74
Alfalfa	748,473	1,850,392	2.47	25,889,781	34.59
Alsike	129,477	179,664	1.39	2,217,556	17.13
Sweet Clover	365,102	810,852	2.22	7,222,221	19.78

The acreages devoted to other crops in 1926 were as follows:—Orchards, 215,779; strawberries, 7,274; vineyards, 7,545; other small fruits, 13,672; summer fallow, 189,488; pasture (cleared), 3,077,424.

TOBACCO.—It is estimated that 19,992 acres were grown in tobacco in 1926 yielding 25,557,724 pounds, or 1,278 per acre. Of this Essex had 9,213 acres, 11,682,084 pounds or 1,268 per acre, and Kent had 9,355 acres, 12,591,830 pounds or 1,346 per acre.

RAPE.—The estimate for 1926 was 22,594 acres of which 7,422 are in Wellington; 2,929 in Grey and 4,592 in Dufferin.

SPRING SOWING AND VEGETATION

All preparations for sowing as well as conditions of vegetation were affected by unusual weather during the whole of the 1926 season, so that it went on record as an exceptionally wet year. Seeding and cultivation began well enough, but were soon set back by the climate. Winter had made a heavier than usual call upon all kinds of fodder, livestock having been stabled early and kept in late. The actual growing season was relatively shortened for farm operations and was also capricious and slow, developing as the months passed into a decidedly backward harvest. The outstanding feature of the crop year appeared in the ability of the farmers to make the most of the conditions facing them. Though behind with operations they were not discouraged by an existing situation or by uncertain prospects for the time ahead. A great deal of plowing had, of necessity, to go over until the spring of 1927; but broadly speaking, the job of maintaining the area of sowing and vegetation was well attended to in every section of the Province. The season afforded no slight proof of strength in the structure of agriculture in Ontario and generally sound practice of Ontario farmers in every department of production.

The crop most injured was corn, and that mainly from the ravages of the European borer, very few cheerful references appearing, so far as reports dealt with this particular crop. There is no question that the farmers of the Lake Erie district are going out of corn-growing on an appreciable scale, and that their alarm is spreading among corn-growers of the entire Province. Tobacco-growing in special areas and other crops generally are receiving some of the attention formerly devoted to the fight against the European corn-borer, in the final issue of which strong hope has had partial suspension so far as the actual cultivators are concerned.

With regard to old alfalfa meadows, oats, barley, peas, beets and some other crops, the injuries of the season were in the main traceable to weather conditions. Spring crops were put in by special effort towards acreage, and fairer prospects of improving conditions for the spring were entertained.

THE GRAIN CROPS

FALL WHEAT.—Bulletin 166 (April, 1926) indicated a late start for the wintering crops. Of a full acreage of fall wheat put in, a good deal had a rather small top when overtaken by winter. Snow covered the ground normally and but little actual winter injury was to be complained of. Fall wheat, in fact, came through in the condition it had attained at the beginning of November. It was because much seeding had been done late that the weather of April proved so trying to fields with too light a top for wintering. Correspondents found that

on low lands the April weather brought in evidence more than usual effects of ice and water; this along with some heaving of heavy soils. Injury to the young plants from both sources was placed from 20 to 30 per cent. Estimates of the crop plowed up ran about 10 per cent. of the whole, replaced by barley or other grains. The reports showed comparatively little injury from insects. Taking the Province of Ontario all in all, the spring was a backward one after one warm spell.

The August Bulletin reported excess rain in the ripening stage of the crop, as well as in the late season and added: "A common feature of harvesting was more than the average percentage of sprouting." Notwithstanding this factor, the volume of grain was reported fair or good in the principal fall wheat districts. Not a few cheerful reports came out of the middle belt of the peninsula, whilst counties fronting Erie, Ontario and Huron had varying conditions to cope with. Indications of smut and rust were of more than usual occurrence. Those who delayed threshing got wet shooks and a good deal of wheat stood in the fields a long time. The earlier threshing reports gave reassuring results with exceptionally fine yields in places. The Lake Ontario section had a fair crop taking the weather into account. With uneven conditions in ripening very much in evidence the quality of grain was up to the average and early harvesting, wherever practical, realized the most satisfactory results. York County sent in reports of good average yield. As harvesting became general, the prevailing weather showed no improvement and in November an exceptionally wet year was acknowledged from every section of the Province. In such a season the outstanding feature of the cereal harvest was the relatively high quality of the fall wheat, many sections sending in reports of excellent quality. On the whole, though short in quantity, the crop was fair for so wet a season. Dawson's Golden Chaff, and O.A.C. 104 are varieties in highest favour over the entire Province. O.A.C. was an average crop of wheat wherever ground had been prepared in good time. Late wheat was discoloured by exposure to frequent rain

THE NEW FALL WHEAT.—In the December Bulletin the following appeared: "Despite unfavourable weather the new fall wheat sown in 1926 will be close to the 1925 sowing. Especially where ground was prepared the seed was sown in good time and under more favourable conditions, but where ground was plowed after harvesting, wet weather interfered as a general condition with operations. Conditions of the ground at seeding time in different sections of the Province were reported in the whole excellent for growth with plenty of moisture, so that the crop, before the snow fell, looked in thrifty condition for winter. The leading fall wheat counties were well prepared for early operations.

SPRING WHEAT.—The December Bulletin reported spring wheat below normal in sample, generally speaking, but in the northern areas a good crop. Severe injury was reported from rust. The area sown, as well as the yield, apparently decreased. The total yield was noticeably under 1925.

OATS.—This crop was in most sections light to fair in the best, showing damage by rain after cutting and considerable wastage from weather conditions. The grain was good in quality but under weight.

BARLEY.—Heavy and frequent rains at harvest damaged a crop of excellent early promise. Particularly unfavourable conditions overtook the late seeding.

RYE.—What rye was raised for grain was damaged as much as other crops, whilst the weater was not at all favourable for cutting green or plowing under. Even in a normal year the crop would not be in line for an increase in point of acreage.

PEAS.—The crop of peas was a good one for the acreage sown. Some of the central counties reported returns better than in the preceding year. Prices were good and the canning centres experienced satisfactory results from all but the late peas which were damaged by rain.

BUCKWHEAT.—Buckwheat, owing to the character of the weather, suffered in a marked way, being exposed to some frost, as well as rain. The stooks in many sections stood in the fields in December.

CORN.—The December Bulletin reported seed corn, even in some of the best districts, badly damaged by weather. When correspondents were reporting in November few of them omitted mention of injury from the European cornborer. Consequently, as the Bulletin stated, "silo-filling was late all over the Province, as well as in the western peninsula, and some districts reported 50 per cent. of corn uncut in mid-November."

Several correspondents agreed in the same opinion that corn will be neglected if the borer cannot be controlled. Some places will be left distinctly short. Ensilage was not of satisfactory quality, whilst the work of harvesting was labourious and slow, a lot of corn being cut by hand and silo-filling made a veritable problem.

TOBACCO.—Though reduced in value by weather conditions mainly, the tobacco crop was judged very good, excellent flue-cured tobacco being reported. An increased acreage was the feature of the season, the County of Elgin being prominent in its appreciation of tobacco growing.

BEANS.—The crop filled out early and looked promising, but later in the harvest season suffered severely from rain. Unfavourable conditions for harvesting prevailed all over Kent, Welland and Elgin. Huron County growers were not as badly hit as those along Lake Erie, where very early beans came through without heavy injury.

HAY AND CLOVER

The winter of 1925-26 was not only long but spring was reluctant and vegetation slow. Pastures were much less advanced than usual in May, and it was obvious at the start that meadows would be the source of some anxiety to the farmers. The advancing season turning out wet, brought better than average results in the long run.

CLOVER.—There had been considerable heaving of clover, especially on old fields with ice and water in low-lying land, occasioning additional injury. But the haying season was favourable and correspondents reporting in regard to it described an extra good crop that went into the barns well secured.

CLOVER SEED.—The December Bulletin said: "Wet weather injured clover seed fields of all kinds and made it practically impossible to harvest the seed crop over large territory. A considerable diminution in the usual quantity of red clover seed was estimated. First crop alfalfa was saved with but slight damage by rain in some sections. The crop in Peel was excellent as to quality.

ALFALFA.—The indications in May were that more alfalfa was being grown instead of red clover, and had done much better than red clover. New seeding came through the winter far better than the old fields. Conditions at cutting time, especially of early crops, were reported very good. Two cuttings in Peel yielded three tons to the acre. In December, a Peel County correspondent said: "Alfalfa was a splendid seed crop though delayed and slightly damaged by rain. The average yield was about 7½ bushels. The year's catch was good."

ALSIKE.—Alsike yielded about 60 per cent. of the average, and generally was of good quality. Some yields are reported especially good. Sixty to seventy thousand dollars' worth of alsike was sold in the Kenora district.

SWEET CLOVER.—This crop, like alfalfa and alsike, had the season's chances to contend against, and some contributors of information to the May Bulletin impressed that it was losing favour in respect to value as fodder and for seed.

POTATOES AND FIELD ROOTS

POTATOES.—In August the Bulletin said: "The crop taken out of the ground early was fair, showing practically no injury. It found a good market and brought satisfactory returns. Reports of later varieties were less favourable by reason of weather conditions. The crop in the whole withstood very well both excessive rains and menace of rot. The acreage planted was below normal with increases noticeable in some seed-growing sections. From northwestern fields early reports were excellent, although the weather held dry while the tubers were forming. Less injury than usual from blight was the general report. The later reports showed the tubers to have grown well but absorbing moisture developed rot to a serious extent. Farmers who tried to grow potatoes in heavy land left fields undug, but in light land the crop in many places was good. Everywhere the wet weather worked more or less injury."

TURNIPS.—In August extensive injury was manifest both from weather conditions and the turnip fly, damage amounting to practical failure being reported from some sections. Fields were plowed up and it was only here and there that fair accounts came through. In December it was admitted that turnips had suffered most in the 1926 list of root crops.

MANGELS.—Conditions were more favourable for mangels, and these extended over the whole Province. Growth from the start was excellent and in December it was ascertained that the crop would be a dependable factor of feeding in winter, which came in with suddenness and definitely. The yield of mangels was little below the average, if anything, and the quality proved good. All roots had been lifted and stored by November 20th.

CARROTS.—Decreased attention appeared to have been given to this crop which gave an over average yield where grown. At pulling time the ground was not in favourable condition as a rule, but in Lincoln County the crop was taken up about the usual time and was better than average quality.

SUGAR BEETS.—Early conditions, as observed, were favourable to the crop, although inadequate moisture was experienced in the first stages of growth. Conditions were consistently fair through the season, and at harvesting the average returns ran twelve tons to the acre, particular fields giving heavier yields. Some reports were of an under-average sugar content, but in the main the character of the crop was satisfactory, though somewhat behind in time of delivery. An East Kent correspondent reported 50 per cent. of beets delivered by the middle of November.

MISCELLANEOUS FEATURES

FLAX.—Merchantable flax seed was around 80 per cent. of the season's production.

FALL PLOWING.—Seldom have the farmers of Ontario experienced a year of greater necessity in every section of the Province to let plowing go over till

spring. But a tremendous effort was put forward to keep the acreage undiminished against heavy odds in the way of rain and the falling in of an early winter.

THRESHING AND MARKETING.—For wheat threshed by mid-October marketing was rapid. Other grains with the exception of oats, which were very light, proved fair in yield and any small surplus available could be promptly sold. Most was kept for feeding. Buckwheat, beans and clover were late in threshing and considerable buckwheat remained in the shock. About 80 per cent. of oats and barley was threshed in good time, and these grains are not marketed. The final estimates of the year indicated that a considerable quantity of screenings would be bought for feeding hogs and cattle.

FARM IMPROVEMENTS.—The years 1925-26 were noted for the amount of improvement being done around the farms, and farm buildings of the Province. The year 1926, said the December Bulletin, proved more than any of its predecessors, the case for drain tiling, but on account of the prevailing weather little tiling could be actually taken in hand.

FRUIT.—The April Bulletin stated: "All classes of fruit have come through with comparatively small injury from winter weather." Some damage was done in places by ice storms, and owing to the steady covering of snow, field mice and rabbits did considerable girdling of young fruit trees. Correspondents estimated that greater harm had been done by mice. A promising showing of buds on the fruit trees, and no complaints regarding small fruit bushes and vines. The slow spring, however, put blossoming back about two weeks and some reports told of winter-killing of peach buds in the Lake Erie and Niagara sections. Other discouragements developed as the season progressed and the August Bulletin made it plan that apples would be below the average in the best orchard districts. Cold weather, late frost and heavy winds had done the damage in the orchards. Spies were quite scarce in the market, as well as other winter apples. Norfolk correspondents sent the most favourable reports received, opinion there claiming 75 per cent. of the average crop. All the commercial varieties of apples were short of the demand, and only modest claims were made for Huron County, which, along with the Georgian Bay district, gave some fair returns. The Duchess gave a good account of itself in a poor year. Late varieties gave the smallest returns, or about 25 per cent. of the normal crop. The late harvest reports were that the Ontario apple crop had left the local market poorly supplied with winter varieties and imported apples were selling in the fall in unusual quantities.

Pears were produced in comparative plenty, in view of the general conditions of the season, but not an average yield.

Plums were a heavy crop, the Niagara peninsula furnishing a supply quite ample for all local demands.

Peaches were late in ripening and were light in yield, estimated from 25 per cent. to 50 per cent. of the avearge Niagara production. Rough winds, lingering cold in the early season, and some frosts in the blossom time handicapped the general crop; but peaches, when they came on the market in restricted supply, were of good quality.

Cherries were plentiful and rapidly marketed.

Grapes, generally a reliable crop, had given good promise in the early stages of growth, but the broken and cool weather retarded ripening and the fruit did not make its appearance on the market till the end of September. The closing weeks of the harvest season were quite as disappointing

Blueberries from the north remained long upon the market and were of excellent quality.

Strawberries were late and patchy and the market for them was to an unusual extent spoiled.

LIVE-STOCK

Live-stock wintered quite fairly and prices were good throughout the year. The April Bulletin stated that an unusual call upon all kinds of fodder marked the rather long 1925-26 winter. Cattle, however, were maintained in good condition. Dairy cattle, horses, swine and sheep all showed successful husbandry for an exacting year. Hay was practically exhuasted by the time the new crop became available, and there was not more than a sufficiency of oats. Silage, under the labourious circumstances of silo-filling, held out remarkably well, and the usual quantity of mill feeds and concentrates was not exceeded. But lingering winter conditions obliged many farmers to turn their animals in pasture before the covering was very inviting. Prices of horses kept up especially for draught animals. Milk flow was reported excellent through the summer months and was not checked by the later conditions of pasturage described in dairying sections as the best ever known. With the approach of winter, again the conditions were at their best and livestock everywhere came off the pastures very fit. In some low pastures the herbage had been soft and poor in feeding value by reason of much rain; but the common experience of the season had been that stock were never in better condition to meet the winter. In old Ontario winter appeared definitely settled at the beginning of December, and in Northern Ontario snowfalls and low temperatures had occurred earlier than usual. Ample rough forage and other feed to carry the stock safely to springtime were reported. Oats, the principal grain for feed, had turned out light and farmers were buying wherever they could at 50c., 65c., and 80c. a bushel. Several localities reported need for oats in considerable quantity. The abundant store of roughage was credited to the popularity of alfalfa and the high relative yield of hay. Mill feed and corn were being purchased to make up for anticipated deficiency. Only among neighbours was grain to be sold and surplus alfalfa hay was available at reasonable prices. For cattle and hog feed grain was $2.00 per cwt.

Prices throughout the year indicated sound trade conditions in regard to nearly all classes of livestock. In mid-November quotations were: Hogs, $10.75 per cwt.; calves, $11 and cattle $5.50 and $6.00; sheep, $6.00 to $7.00; lambs, $9.00 to $10.00. Sheep and lambs seldom had gone into winter quarters better looking. Choice butchers' steers and heifers brought from $6.00 to $6.50; common, $4.75 to $5.00. Fat cows were sold at $4.50 to $5.00, and common, $3.25 to $3.75. Demand for canners was from $2.00 to $2.50. Baby beefs sold around $11.00 to $11.50 and choice feeders, $5.75 to $6.00. Quotations for hogs went to $10.00 and $11.00 live weight, and $12.00 to $13.00 for select bacon. There was no sign of depression in the livestock market up to the end of the year.

DAIRYING.—A stable situation is stated to have marked the leading farm industry of the Province through the year. Cheese prices were low because of the situation in Britain, but some signs were becoming visible of improvement in the affairs of the working classes of England. The average fall in price was from 5c. to 6c. Butter, on the other hand, brought fair prices in the home market and there was not much for export. Betterment in quality and uniformity were marked from the beginning of the year, and the tendency of prices to rise with

the coming of fall was well asserted in face of large production. Correspondents both in Western and Eastern Ontario referred with satisfaction to the effects of experience in cream grading. No outstanding features were described in regard to dairy herds, and Holsteins hold the place of favourites. Too many farmers in all sections of the Province are milking cows giving low-per-day yield. Correspondents generally incline to the opinion of steadily improving outlook for butter. Flow of milk and price arrangements with dairies in the principal cities of the Province were not complained of during the year.

POULTRY.—Poultry raising gained perceptibly in the course of the year. The general turn of comment upon this industry was favourable. Returns are profitable both from eggs and dressed poultry. Farmers are resorting in marked numbers to the practice of obtaining chicks from poultrymen with large incubators and this has its effect in the increase reported in farm flocks. Turkeys were reported to have done rather badly owing to the wet weather, and the demand for Ontario turkeys was not fully supplied. Distinctly favourable comment has been the rule in regard to egg grading. It has stimulated the domestic market more than was anticipated, and under its influence Ontario eggs are advancing into higher favour all the time.

FODDER SUPPLIES

The experience of the year, except for rough fodder, impressed the farmer with the necessity for large provision of oat supplies. It is to be concluded from the remarks of correspondents that the proportion of oats must be increased very considerably to be adequate. The shortage of 1926 is not likely to be incurred again. What is happening to the corn crop is another reason for placing more dependence upon oats. It is likely that all fodder supplies planned for will be fed on the farm. Activity in the dairying line under any circumstances would mean a shortage of some grains in certain diarying districts, and as there was no fodder or grain for sale in the late winter, replenishing of supplies became a pressing order with farmers generally. Quite as many cattle are being fed, and whilst economy had to be systematically practised in 1926, one of the lessons of the winter was of vigilance concerning the immediate future. According to the August Bulletin, farmers were then thinking of increasing their stock in prospect of an easy winter, which, as events turned out, was a rather sanguine view. Oats fell very short in supply, and it is inevitable that this is to be the principal line by which farmers have decided to lay up supplies. The fact that turnips were a partial failure is calculated to turn increased attention to the supply of roots.

LABOUR AND WAGES

According to the April Bulletin the more or less chronic scarcity of labour was not pressing, except in regard to skilled labour, which correspondents were united in describing as very hard to get. Domestic servants were also scarce as ever. Labour wages ranged from $25 to $40 per month, with board, averaging $33 by the month and $2 by the day, or a little higher, some men holding out for $2.75 and $3. Yearly rates for single men ran from $250 to $350, according

to ability. It was noted that married men are not so much in favour as helpers as formerly.

The August Bulletin also voiced less complaint of the supply of farm labour and more as to the quality of the help offered. The per day rate paid was $2 to $3, according to ability and the needs of the locality. During the heavy haying time, labour was scarce in more remote localities. Close to large centres, as in York County, $35 to $50 a month, with board, was paid. Year-round contracts are not in the increase, though wages from $300 to $325 are obtainable. The class of immigrants offered as farm help are, as a rule, inexperienced or have a lot to learn concerning the Ontario farm. Men coming from Scotland appear to be suited to the needs of the average employer, are best adapted to social conditions, and generally give satisfaction.

Some of the remarks of correspondents point to striking uniformity of farm experience with labour: "The Government would be in a good work training agricultural workers on a farm in each township for a year or more " "Farmers are largely doing without help." "Immigrants have been helping Ontario to some extent, though not equal to home help." "Some married men are being paid $75 a month with house, garden, milk and wood." "There is strong demand for experienced men, especially those who can milk." "Immigration of family units should be tried." "A steady immigration policy with more careful hand-picking of immigrants." "Farmers should sell some of their land to immigrants with money." "Too many farmers hire for summer and allow their help to go in the fall." "Good horses are spoiled by green help sent to the farmers." "Those only have satisfaction who keep their help the year round." "There should be the freest admission of farm labour from the old land." "Farm help is absolutely essential." "We want Scotch and Irish help, both male and female." "The Scottish and Danish immigrants have proven the most satisfactory." "A logical plan to follow would appear to be that all immigrants designated for the farms of Ontario should receive a special training before being hired out."

A phase of the situation deserving of attention is the tendency of an apparently increasing number of farmers to dispense with hired help because of the difficulty of obtaining it and its uncertainty when hired. This is indicated by correspondents from practically all the counties of the Province: "Farmers are largely doing without help and procuring more modern machinery." "A number intend to get along without hiring help, doing what they can themselves and seeding down a considerable acreage to grass." "Farmers who have help of their own are gaining, but those who have to hire are at a standstill." "Much farm land will go without a crop." "Farmers will get along alone rather than increase wages." "Farm conditions do not warrant any raise of wages." "Art and science are lessening muscle work."

The boy labour problem is not altered from what it has been, although a more satisfactory note is often struck in the comment upon it. Thus: "The Salvation Army in Woodstock has done much to help farmers in this section." "Boy scheme is O.K. but here also handpicking is desired."

The Ontario farmer is prone to depend on family help to the furthest possible extent. The female domestic is becoming unknown on the farms of the Province, and there is a general demand for her class with but slight chance of having it responded to. Indeed, as time goes on this phase of the farm help problem grows more difficult. On the farms near enough to towns the situation is without much hope. A Victoria County correspondent declares: "Female help is out of the question."

TEMPERATURE, 1926

TABLE I.—Showing for each month the highest, lowest, mean daily range, and mean temperature at the principal stations in Ontario for 1926; also the annual mean for each station.

Months	Southampton °	Chatham °	London °	Woodstock °	Stoney Creek °	Toronto °	Lindsay °	Beatrice °	Ottawa °	MontrealRiver °
January:										
Highest	42.0	49.0	42.0	40.0	44.0	45.6	38.5	37.0	38.0	40.0
Lowest	— 6.7	— 4.0	— 8.0	— 6.4	—2.0	— 5.2	—21.0	—30.1	—23.0	—39.0
Daily range	11.1	12.3	12.1	11.7	14.0	12.1	18.1	19.0	16.4	31.6
Monthly mean	22.0	24.2	20.6	21.5	25.4	24.8	18.6	16.2	14.5	7.7
February:										
Highest	38.5	43.0	41.0	41.5	42.0	40.3	37.7	36.0	37.0	37.0
Lowest	— 7.7	— 4.0	— 5.0	— 6.0	0.0	1.0	—15.0	—22.0	—16.5	—33.0
Daily range	16.4	14.2	14.5	13.7	16.7	13.4	20.5	21.9	20.0	32.5
Monthly mean	17.1	25.8	21.1	19.0	22.0	21.0	14.7	12.6	13.9	5.1
March:										
Highest	44.5	54.0	50.0	46.5	45.0	47.8	46.0	44.0	46.5	48.0
Lowest	—14.1	6.0	— 5.0	— 4.5	1.0	— 1.1	—14.2	—14.0	—10.7	—30.0
Daily range	17.4	16.7	16.1	12.2	12.0	11.9	20.4	18.5	18.7	31.4
Monthly mean	19.6	29.0	25.7	23.0	26.5	26.1	19.0	17.7	21.8	11.4
April:										
Highest	72.3	77.2	76.4	74.3	76.6	71.3	74.0	70.9	73.5	72.6
Lowest	8.9	18.0	16.0	14.0	17.0	15.6	6.0	— 3.0	11.0	— 9.0
Daily range	16.6	19.8	19.1	17.1	16.1	15.9	19.0	19.6	17.6	25.6
Monthly mean	31.9	40.7	37.9	36.0	38.6	37.4	33.2	29.2	34.6	28.4
May:										
Highest	76.2	84.0	85.0	80.0	85.0	80.0	82.1	80.0	82.0	90.0
Lowest	24.1	26.0	29.0	24.6	29.0	28.9	24.8	20.0	28.5	13.0
Daily range	21.5	25.7	28.0	24.2	23.9	20.3	28.2	27.8	23.1	32.8
Monthly mean	46.7	55.5	54.2	52.0	51.6	52.8	51.8	48.3	52.4	45.8
June:										
Highest	76.5	89.0	87.0	81.5	86.0	83.4	85.8	78.0	85.0	86.0
Lowest	31.5	39.0	37.0	36.5	34.0	34.5	30.0	40.0	44.0	27.0
Daily range	20.3	21.7	23.6	20.5	23.1	20.9	35.3	24.0	22.8	34.2
Monthly mean	54.0	63.9	61.0	58.5	59.4	59.8	57.6	55.3	60.5	54.3
July:										
Highest	89.8	99.0	97.0	91.2	95.0	91.3	89.5	87.0	88.0	91.0
Lowest	40.9	50.0	44.0	43.7	41.0	46.2	40.4	39.0	46.5	37.0
Daily range	23.2	23.5	25.2	21.4	23.1	20.0	26.4	26.5	21.5	33.3
Monthly mean	63.2	72.7	69.2	66.1	66.6	67.8	66.4	63.0	67.4	62.1
August:										
Highest	82.5	94.0	90.0	85.0	88.0	86.0	87.0	83.0	86.0	91.0
Lowest	43.9	48.0	43.0	45.0	45.0	50.0	41.6	35.0	46.5	30.0
Daily range	17.4	20.1	19.6	15.8	16.4	15.8	21.1	20.2	19.1	31.2
Monthly mean	63.9	72.5	68.9	66.8	68.1	68.5	65.6	62.4	66.6	59.8
September:										
Highest	75.5	86.0	85.0	78.0	80.0	79.8	77.3	76.0	84.0	73.0
Lowest	34.6	34.0	36.0	35.0	36.0	35.6	30.2	28.0	33.5	21.0
Daily range	16.3	18.7	18.8	15.2	15.5	15.6	20.5	18.7	19.0	26.4
Monthly mean	56.1	64.6	60.8	58.3	59.4	59.0	56.3	52.9	57.3	49.7
October:										
Highest	84.2	84.0	81.0	79.8	83.0	79.2	74.0	80.0	79.0	81.0
Lowest	25.1	29.0	27.0	27.5	30.0	30.2	22.0	18.0	25.0	15.0
Daily range	13.4	17.0	16.4	14.2	16.2	14.2	22.1	15.9	17.4	21.0
Monthly mean	45.5	51.1	47.2	45.7	47.2	47.2	45.9	41.6	45.5	41.1
November:										
Highest	61.5	66.0	59.0	63.0	68.0	63.2	62.5	59.0	62.8	51.0
Lowest	[illegible]	18.0	7.0	12.8	17.0	15.0	7.1	2.0	1.5	—23.0
Daily range	11.6	14.2	12.7	12.1	14.2	11.6	15.8	16.1	15.1	21.3
Monthly mean	35.0	39.1	35.8	34.5	37.7	37.4	32.7	30.3	32.7	23.5
December:										
Highest	[illegible]	48.0	45.0	45.3	46.0	43.0	40.6	38.0	36.0	39.0
Lowest	— 2.7	5.0	— 4.0	— 3.0	— 2.0	— 3.1	—13.5	—22.0	— 9.5	—29.0
Daily range	11.2	12.3	12.7	11.5	15.2	12.3	16.6	17.5	14.4	29.6
Monthly mean	22.2	26.5	27.8	21.0	23.9	24.0	17.8	16.3	15.5	11.8
Annual mean	[illegible]	47.1	44.4	41.9	43.9	43.8	40.0	37.2	40.2	33.4

AVERAGE TEMPERATURE FOR FORTY-FIVE YEARS

TABLE II.—Showing for each month the monthly average for the highest, lowest, mean daily range and mean temperature at the principal stations in Ontario, derived from the forty-five years, 1882-1926; also the annual mean at each station for the same period.

Months	Southampton	Chatham	London	Woodstock	Stoney Creek	Toronto	Lindsay	Beatrice	Ottawa	Montreal River
	°	°	°	°	°	°	°	°	°	°
January:										
Highest	44.1	46.0	45.7	45.4	49.2	45.1	41.3	40.7	40.1	37.9
Lowest	—7.4	—7.8	—9.4	—10.4	—5.0	—7.2	—20.4	—27.5	—21.6	—33.9
Daily range	14.6	12.3	15.2	15.8	14.6	14.6	18.1	20.5	18.0	24.0
Monthly mean	20.7	21.8	21.4	20.1	24.5	22.4	15.8	14.0	11.2	6.3
February:										
Highest	43.6	48.3	46.2	45.1	47.6	44.9	41.7	41.9	40.0	40.9
Lowest	—11.6	—8.5	—10.6	—11.0	—5.9	—7.1	—17.9	—26.8	—20.2	—33.8
Daily range	16.7	13.9	16.7	16.5	15.4	15.2	19.6	22.1	19.0	24.1
Monthly mean	18.8	21.0	20.5	19.3	22.7	21.3	15.5	13.6	12.6	9.5
March:										
Highest	54.7	59.5	59.6	56.8	60.1	56.8	53.0	51.5	50.1	50.6
Lowest	—2.6	0.9	0.3	—0.3	5.5	4.2	—6.6	—12.7	—8.0	—22.6
Daily range	17.0	15.3	17.8	16.8	15.2	14.7	18.9	21.0	17.7	25.3
Monthly mean	26.5	30.5	30.1	28.4	32.4	30.1	25.8	23.7	24.6	20.4
April:										
Highest	72.3	77.2	76.4	74.3	76.6	71.3	74.0	70.9	73.5	72.6
Lowest	15.5	18.7	18.2	17.3	20.3	20.7	13.7	10.0	15.1	5.2
Daily range	17.7	18.5	20.8	19.9	17.4	16.8	21.2	21.2	19.3	24.1
Monthly mean	40.3	44.0	43.4	42.3	44.0	42.8	41.5	39.2	41.3	38.1
May:										
Highest	79.6	83.4	83.2	80.5	84.3	80.1	82.6	80.8	82.8	84.4
Lowest	28.4	29.6	29.2	29.0	32.8	31.9	27.7	26.3	31.0	19.4
Daily range	19.5	21.3	23.2	21.8	20.4	19.3	24.1	23.2	22.0	26.3
Monthly mean	50.8	55.3	55.2	53.5	54.4	53.9	53.8	51.9	54.8	51.5
June:										
Highest	85.1	89.0	89.4	86.6	91.1	87.8	88.9	86.6	88.3	89.9
Lowest	37.4	38.4	38.1	38.5	41.2	42.2	38.2	35.7	41.7	33.5
Daily range	19.9	22.0	23.6	22.3	21.5	20.4	24.9	24.4	21.6	27.3
Monthly mean	60.5	65.2	65.0	63.4	65.2	64.2	63.6	62.0	64.6	61.6
July:										
Highest	87.4	92.9	92.6	89.5	92.6	91.4	91.7	89.3	91.1	91.8
Lowest	43.9	44.6	44.2	44.5	48.0	48.7	43.9	42.3	48.1	40.2
Daily range	20.1	22.2	23.4	22.5	21.5	20.5	24.8	23.4	20.8	25.7
Monthly mean	61.2	69.7	69.4	67.7	71.0	69.3	67.9	66.4	68.9	65.6
August:										
Highest	86.0	91.1	91.1	88 3	92.9	89.1	90.0	87.8	88.9	88.5
Lowest	41.9	43.0	41.0	41.6	55.5	46 4	40 4	37.9	43.8	36.9
Daily range	18.2	21.2	23.7	23.2	21.3	21.8	24.4	23.2	20.9	25.0
Monthly mean	64.6	67.6	66.9	65.1	68.8	66.2	65.5	64.0	66.2	62.5
September:										
Highest	84.1	87.7	87.0	84.6	89.2	85.4	85.6	83.1	84.4	83.4
Lowest	34.4	34.9	32.3	32.3	36.1	36.7	31.6	30.2	33.3	29.0
Daily range	18.1	19.9	22.4	21.4	20.4	18.7	22.9	21.5	20.4	23.4
Monthly mean	59.1	61.6	60.7	59.1	62.4	60.6	58.4	57.4	58.3	55.2
October:										
Highest	74.2	76.6	76.1	74.2	77.4	73.6	74.1	72.3	72.0	73.1
Lowest	26.0	26.0	24.2	24.2	26.6	27.2	21.6	21.2	24.5	18.0
Daily range	16.0	17.3	20.1	18.9	18.8	16.6	19.9	18.9	17.6	19.6
Monthly mean	48.1	49.7	48.5	47.7	50.4	48.7	46.3	45.6	46.0	43.1
November:										
Highest	60.9	63.0	61.9	61.0	64.9	60.4	59.2	58.3	58.0	55.1
Lowest	14.6	14.9	13.5	12.5	17.6	15.9	6.8	6.3	7.4	—1.0
Daily range	13.1	12.5	14.6	14.4	14.0	12.8	15.1	14.5	12.4	15.0
Monthly mean	36.8	37.6	36.8	35.6	39.3	37.6	33.7	33.1	32.8	29.2
December:										
Highest	49.3	49.8	52.5	49.2	53.4	48.9	45.7	44.8	43.0	43.2
Lowest	0.8	0.5	—1.7	—2.8	—0.7	—0.4	—12.8	—15.4	—14.7	—25.0
Daily range	12.5	10.7	13.4	13.4	12.8	12.6	15.9	17.2	14.7	19.3
Monthly mean	26.7	26.8	26.4	25.0	28.9	27.4	21.3	20.2	17.8	14.0
Annual Mean	42.9	45.9	45.3	43.9	47.0	45.4	42.4	40.9	41.6	38.1

RAIN AND SNOW

TABLE III.—Summary of the total fall of rain and snow and the number of days on which rain and snow fell in Ontario during 1926, at stations reporting the whole year, and the average of the Province.

Stations	Rain		Snow	
	Inches	Days	Inches	Days
ALGOMA:				
Franz	23.25	58	128.5	49
Kapuskasing	9.48	48	109.9	58
Steep Hill Falls	30.17	76	229.5	93
Michipicoten	25.31	63	155.3	52
BRANT:				
Brantford	34.49	109	61.1	46
Paris	38.91	102	70.6	40
BRUCE:				
Southampton	29.09	105	120.6	86
Wiarton	24.38	67	182.0	60
CARLETON:				
Ottawa	22.14	94	113.7	80
DUNDAS:				
Morrisburg	29.60	63	148.3	56
DURHAM:				
Orono	31.04	87	59.1	37
ESSEX:				
Harrow	30.88	73	68.9	32
Leamington	30.53	73	53.3	24
Pelee Island	36.04	77	63.0	29
Windsor	28.87	77	47.5	34
ELGIN:				
St. Thomas	37.33	108	44.2	31
FRONTENAC:				
Kingston	31.87	106	63.5	52
GREY:				
Eugenia	19.75	66	93.5	45
HALTON:				
Georgetown	31.84	79	52.7	33
HASTINGS:				
Belleville	28.08	87	52.8	30
Queensboro'	20.74	84	116.0	38
Trenton	28.36	81	83.2	37
HURON:				
Clinton	29.32	76	70.6	27
Goderich	25.74	101	82.1	47
KENT:				
Chatham	30.85	74	69.5	32
Ridgetown	34.30	81	69.0	28
LANARK:				
Dalhousie Lake	26.00	105	131.5	47
LINCOLN:				
St. Catharines	28.60	101	58.0	33
Vinelands	29.10	96	40.1	25
LEEDS:				
Brockville	27.53	42	85.5	28
MANITOULIN:				
Providence Bay	13.25	26	158.5	31
MIDDLESEX:				
London	33.40	117	115.3	54
Lucan	28.43	101	137.3	56
MUSKOKA:				
Beatrice	30.32	102	141.0	51
NIPISSING:				
Iroquois Falls	17.34	79	105.2	68
Montreal River	18.46	85	119.1	66
New Liskeard	14.77	73	98.2	52
North Bay	18.36	79	94.1	67
Sturgeon Falls	16.38	70	119.5	53
NORFOLK:				
NORTHUMBERLAND:				
Healy Falls	24.89	79	68.6	35
OXFORD:				
Woodstock	32.00	108	64.3	65
PARRY SOUND:				
Magnetawan	20.21	81	153.5	78
Nipissing	17.68	77	111.6	55
Parry Sound	24.28	98	137.9	71
PEEL:				
Alton	23.25	78	99.3	46
PERTH:				
Stratford	33.39	93	125.9	58
PETERBOROUGH:				
Aspley	32.59	111	112.3	58
Peterborough	25.76	95	102.6	58
PRINCE EDWARD:				
Bloomfield	26.44	80	99.5	35
RAINY RIVER:				
Emo	17.85	57	75.0	45
Fort Frances	18.80	57	90.6	40
Kenora	21.32	37	98.0	42
Mine Centre	21.90	70	98.0	83
Sioux Lookout	17.37	53	92.5	44
RENFREW:				
Clontarf	18.31	56	107.6	48
Pembroke	21.99	82	103.9	51
Renfrew	23.18	82	84.2	35
SIMCOE:				
Orillia	25.73	103	102.1	62
SUDBURY:				
Chapleau	23.57	67	115.7	51
Coniston	20.37	68	80.3	43
Sudbury	17.55	79	97.5	55
Timmins	15.84	65	72.7	61
THUNDER BAY:				
Kakabeka Falls	23.26	84	88.5	50
Kaministiquia	20.23	72	96.0	64
Port Arthur	23.81	71	63.4	60
Savanne	21.94	76	95.5	54
VICTORIA:				
Fenelon Falls	33.18	96	122.5	68
Lindsay	24.09	91	91.5	58
WATERLOO:				
Kitchener	31.02	81	83.0	38
WELLAND:				
Falls View	30.25	91	76.0	33
Welland	34.14	110	75.8	43
WELLINGTON:				
Guelph	34.83	80	74.3	37
Mount Forest	11.75	94	100.6	56
WENTWORTH:				
Stoney Creek	21.49	80	36.8	20
YORK:				
Agincourt	30.60	100	61.6	43
Toronto	31.64	113	62.1	59
Average for the Province: 1926	25.89	81	95.4	48
1925	24.21	84	70.5	40
1924	23.18	77	75.0	40
1882-1926	24.30	74	72.8	39

RAIN AND SNOW

TABLE IV.—Monthly summary of inches of rain and snow in precipitation in the several districts in Ontario in 1926, also the average derived from the forty-five years, 1882-1926.

Months	West and Southwest		North and Northwest		Centre		East and Northeast		The Province	
	Rain	Snow	Rain	Snow	Rain	Snow	Rain	Snow	Rain	Snow
1926	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
January	0.64	21.1	0.09	16.8	0.56	16.7	0.87	14.9	0.54	17.4
February	0.93	18.7	0.00	11.6	0.65	16.5	0.58	17.2	0.54	16.0
March	1.52	11.1	0.08	18.2	0.94	18.0	0.75	24.7	0.82	18.0
April	2.12	8.3	0.38	10.6	1.91	8.7	1.70	13.3	1.53	10.2
May	1.37	0.1	1.43	0.8	1.82	0.1	1.25	......	1.47	0.3
June	3.04	......	3.77	0.1	3.10	......	3.21	......	3.28	......
July	1.60	......	3.81	......	2.42	......	3.06	......	2.72	......
August	6.22	......	2.23	......	4.47	......	3.46	......	4.10	......
September	5.36	......	3.97	0.2	3.99	......	3.17	......	4.12	0.1
October	3.81	1.7	2.42	5.0	3.56	1.3	3.70	2.0	3.37	2.5
November	3.36	8.9	1.31	31.5	3.78	10.0	4.12	5.0	3.14	13.8
December	0.34	16.4	0.09	15.8	0.32	17.5	0.29	18.7	0.26	17.1
The year	30.31	86.3	19.58	110.6	27.52	88.8	26.16	95.8	25.89	95.4
1882-1926										
January	1.12	16.1	0.58	23.2	1.00	16.6	0.89	19.9	0.90	18.9
February	1.08	13.9	0.38	18.6	0.85	14.2	0.60	16.5	0.73	15.8
March	1.42	8.5	0.86	13.1	1.30	9.6	1.16	11.5	1.18	10.7
April	2.12	2.2	1.54	4.2	2.05	3.0	1.73	3.7	1.86	3.3
May	3.05	0.1	2.49	0.1	2.77	0.1	2.66	0.1	2.74	0.1
June	2.92	......	2.70	S	2.76	......	2.82	......	2.80	......
July	2.70	......	2.96	......	2.83	......	2.83	......	2.83	......
August	2.82	......	2.82	......	2.45	......	2.62	......	2.68	......
September	2.74	......	3.06	S	2.47	......	2.64	S	2.73	S
October	2.73	0.8	2.79	2.4	2.55	0.7	2.53	1.1	2.65	1.2
November	2.24	5.3	1.74	11.9	1.98	5.1	1.85	7.2	1.95	7.4
December	1.98	14.3	0.76	20.6	1.18	11.9	1.07	14.3	1.25	15.3
The year	26.92	61.2	22.68	94.1	24.19	61.2	23.40	74.3	24.30	72.7

SUNSHINE

TABLE V.—Monthly summary of bright sunshine at the principal stations in Ontario for 1926, *showing the number of hours the sun was above the horizon, the hours of registered sunshine,* the total for the year, and the average derived from the forty-five years, 1882-1926.

Months	Sun above horizon	Woodstock	Toronto	Lindsay	Kingston	Ottawa	Average of five stations		
							1926	1925	1882–1926
1926	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.
January	285.7	42.1	57.3	49.7	62.9	65.3	55.5	81.5	....
February	291.4	63.5	85.2	102.8	109.4	111.3	94.4	86.4	....
March	369.9	154.9	170.8	152.4	170.0	184.0	166.4	128.7	....
April	406.4	172.0	189.5	154.6	190.6	185.6	178.5	225.1	....
May	461.1	272.5	283.9	243.4	260.8	252.2	262.6	189.4	....
June	465.7	269.1	275.8	202.1	252.4	247.4	249.4	268.3	....
July	470.9	321.7	303.4	238.4	280.6	266.5	282.1	251.6	....
August	434.5	160.1	197.7	170.0	196.1	211.7	187.1	274.4	....
September	376.3	139.2	144.0	106.1	155.0	141.1	137.1	136.3	....
October	340.2	112.1	117.7	102.3	128.8	99.7	112.1	116.6	....
November	286.9	58.9	64.6	37.2	64.0	77.7	60.5	90.2	....
December	274.3	62.2	64.8	61.7	60.1	82.7	66.3	58.6	....
The year	4,463.3	1,828.3	1,954.7	1,620.7	1,930.7	1,925.2	1,852.0	1,907.1	....
1882–1926									
January	....	66.3	78.1	74.7	79.1	89.0	....	....	77.4
February	....	91.2	107.3	100.1	109.6	112.6	....	....	104.2
March	....	127.3	154.5	145.0	146.9	154.3	....	....	145.6
April	....	169.6	189.1	178.4	180.7	191.6	....	....	181.9
May	....	213.1	226.0	207.6	210.2	214.8	....	....	214.3
June	....	253.3	263.6	235.1	250.2	240.2	....	....	248.5
July	....	276.2	285.2	249.5	271.7	259.8	....	....	268.5
August	....	234.9	252.2	224.3	247.5	242.7	....	....	240.3
September	....	175.7	204.8	180.2	182.3	174.8	....	....	183.5
October	....	145.1	152.6	127.5	139.7	133.4	....	....	139.7
November	....	75.9	83.0	69.3	79.3	82.6	....	....	78.0
December	....	55.4	65.4	56.3	68.2	67.1	....	....	62.5
The year	....	1,884.0	2,061.8	1,848.0	1,965.4	1,962.9	....	....	1,944.4

RURAL AREA ASSESSED

TABLE VI.—Showing by County Municipalities the rural area of Ontario as returned by Municipal Assessors for 1926 to the Bureau of Municipal Affairs.

Counties and Districts	Acres of Assessed Land			Acres Cleared			Per cent. cleared
	Resident	Non-resident	Total	Resident	Non-resident	Total	
Algoma	276,973	56,752	333,725	62,198	3,164	65,362	19.59
Brant	215,595	13	215,608	179,173	13	179,186	83.11
Bruce	921,430	8,081	929,511	575,955	4,042	579,997	62.40
Carleton	553,327	10,091	563,418	382,600	4,743	387,343	68.75
Cochrane	102,582	38,440	141,022	14,312	2,521	16,833	11.94
Dufferin	355,915	345	356,260	284,502	....	284,502	79.86
Dundas	236,416	....	236,416	186,610	....	186,610	78.93
Durham	365,632	3,015	368,647	307,700	1,746	309,446	83.94
Elgin	436,422	745	437,167	366,286	602	366,888	83.92
Essex	415,446	6	415,452	372,943	6	372,949	89.77
Frontenac	630,850	56,238	687,088	249,059	4,612	253,671	36.92
Glengarry	288,588	200	288,788	201,403	100	201,503	69.78
Grenville	260,019	11,496	271,515	179,562	8,052	187,614	69.10
Grey	1,065,399	680	1,066,079	708,815	103	708,918	66.50
Haldimand	282,452	....	282,452	247,996	....	247,996	87.80
Haliburton	551,367	35,627	586,994	46,307	5,413	51,720	8.81
Halton	214,153	10,286	224,439	167,506	5,426	172,932	77.05
Hastings	990,772	95,486	1,086,258	421,663	6,261	427,924	39.39
Huron	791,621	8,542	800,163	671,571	7,612	679,183	84.88
Kenora	71,664	13,959	85,623	8,146	1,021	9,167	10.71
Kent	567,344	....	567,344	490,193	....	490,193	86.40
Lambton	660,797	409	661,206	536,154	8	536,162	81.09
Lanark	660,031	11,350	671,381	334,416	4,345	338,761	50.46
Leeds	467,248	3,457	470,705	270,508	813	271,321	57.64
Lennox & Addington	428,613	12,632	441,245	256,265	411	256,676	58.17
Lincoln	188,314	1,073	189,387	163,804	965	164,769	87.00
Manitoulin	283,605	48,292	331,897	49,918	946	50,864	15.33
Middlesex	738,748	17,755	756,503	659,380	16,113	675,493	89.29
Muskoka	536,879	31,894	568,773	70,472	1,537	72,009	12.66
Nipissing	294,530	23,763	318,293	65,221	2,376	67,597	21.24
Norfolk	391,697	4,139	395,836	283,023	2,470	285,493	72.12
Northumberland	435,448	798	436,246	356,057	798	356,855	81.80
Ontario	506,295	1,561	507,856	387,017	11	387,028	76.21
Oxford	468,811	2,478	471,289	401,371	1,709	403,080	85.53
Parry Sound	567,527	77,619	645,146	84,695	5,772	90,467	14.02
Peel	287,788	....	287,788	263,703	....	263,703	91.63
Perth	512,509	6,680	519,189	455,034	3,610	458,644	88.34
Peterborough	538,990	49,225	588,215	263,105	7,974	271,079	46.09
Prescott	291,763	2,389	294,152	221,048	1,209	222,257	75.56
Prince Edward	234,708	615	235,323	199,932	....	199,932	84.96
Rainy River	272,186	80,461	352,647	45,573	4,974	50,547	14.33
Renfrew	1,020,689	61,553	1,082,242	383,914	15,464	399,378	36.90
Russell	250,051	919	250,970	166,497	409	166,906	66.50
Simcoe	947,576	10,456	958,032	686,177	6,028	692,205	72.25
Stormont	244,966	3,000	247,966	167,684	1,000	168,684	68.03
Sudbury	265,175	129,416	394,591	63,442	10,454	73,896	18.73
Thunder Bay	438,520	41,474	479,994	43,817	4,357	48,174	10.04
Timiskaming	246,608	57,147	303,755	64,907	5,813	70,720	23.28
Victoria	581,642	9,144	590,786	288,795	2,823	291,618	49.36
Waterloo	305,731	1,038	306,769	254,244	791	255,035	83.14
Welland	219,412	1,742	221,154	181,011	1,339	182,350	82.45
Wellington	627,624	2	627,626	506,971	2	506,973	80.78
Wentworth	268,045	....	268,045	212,327	....	212,327	79.21
York	531,416	1,681	533,097	443,373	1,069	444,442	83.37
The Province:							
1926	24,307,909	1,044,164	25,352,073	14,954,355	161,027	15,115,382	59.62
1925	24,237,225	1,132,190	25,369,415	14,958,876	138,420	15,097,296	59.51
1924	....	....	25,411,037	....	....	15,085,390	59.37
1923	....	....	25,353,517	....	....	15,054,463	59.38
1922	....	....	25,393,470	....	....	15,015,659	59.13

NOTE.—Statistics regarding non-resident lands which should include unoccupied lands assessable are not satisfactory as many assessors do not make any distinction on their rolls.

FALL WHEAT AND SPRING WHEAT

TABLE VII.—Showing by County Municipalities of Ontario the area, produce and market value of Fall Wheat and Spring Wheat for the year 1926, together with the comparative totals for the Province for 1925.

Counties and Districts	Fall Wheat				Spring Wheat			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
Algoma	302	7,882	26.1	10,247	1,246	26,166	21.0	34,016
Brant	17,490	459,987	26.3	580,504	71	1,420	20.0	1,728
Bruce	28,490	623,931	21.9	783,657	493	8,135	16.5	10,218
Carleton	172	3,010	17.5	3,913	6,681	135,624	20.3	176,311
Dufferin	1,452	32,525	22.4	40,656	2,659	51,585	19.4	64,481
Dundas	78	1,716	22.0	2,116	1,132	20,829	18.4	25,807
Durham	12,345	278,997	22.6	351,257	6,052	107,726	17.8	130,779
Elgin	27,034	708,291	26.2	874,031	174	3,480	20.0	4,315
Essex	59,973	1,517,317	25.3	1,858,713	1,348	27,230	20.2	32,404
Frontenac	451	9,471	21.0	12,218	1,479	25,587	17.3	33,110
Glengarry	575	11,500	20.0	14,950	4,548	83,228	18.3	102,370
Grenville	37	740	20.0	916	431	8,620	20.0	10,577
Grey	25,765	515,300	20.0	648,247	2,108	35,836	17.0	44,687
Haldimand	21,176	567,517	26.8	720,179	681	13,348	19.6	16,365
Haliburton	15	300	20.0	390	27	405	15.0	527
Halton	12,540	391,248	31.2	492,190	755	16,610	22.0	20,447
Hastings	5,528	119,958	21.7	155,226	1,664	31,450	18.9	40,036
Huron	38,080	948,192	24.9	1,184,292	887	16,055	18.1	19,812
Kent	78,242	2,073,413	26.5	2,542,004	1,486	31,206	21.0	37,166
Lambton	56,310	1,604,835	28.5	1,978,762	350	7,000	20.0	8,631
Lanark	328	7,216	22.0	9,236	5,983	111,882	18.7	142,985
Leeds	376	8,385	22.3	10,959	1,264	25,912	20.5	33,167
Lennox & Add'gton	1,400	29,120	20.8	36,837	3,149	66,129	21.0	82,926
Lincoln	14,295	327,356	22.9	409,522	149	2,682	18.0	3,353
Manitoulin	500	11,000	22.0	13,794	1,579	24,001	15.2	30,913
Middlesex	57,124	1,633,746	28.6	2,043,816	283	5,660	20.0	7,018
Muskoka	13	286	22.0	372	231	4,620	20.0	6,006
Nipissing	37	592	16.0	770	760	10,184	13.4	13,239
Norfolk	23,517	597,332	25.4	741,289	75	1,500	20.0	1,850
Northumberland	15,722	399,339	25.4	493,982	5,110	99,134	19.4	120,943
Ontario	19,098	471,721	24.7	598,142	4,013	73,839	18.4	90,748
Oxford	34,760	983,708	28.3	1,231,602	91	1,638	18.0	2,064
Parry Sound	15	270	18.0	351	353	6,072	17.2	7,894
Peel	13,788	402,610	29.2	509,704	2,445	53,546	21.9	66,451
Perth	30,500	826,550	27.1	1,054,678	381	7,239	19.0	9,179
Peterborough	12,700	320,040	25.2	401,010	4,274	76,932	18.0	92,549
Prescott	195	3,900	20.0	5,070	2,832	58,622	20.7	76,209
Prince Edward	3,611	79,442	22.0	95,648	1,493	27,621	18.5	32,455
Rainy R. & Kenora	46	966	21.0	1,256	533	12,046	22.6	15,660
Renfrew	335	6,868	20.5	8,448	26,952	471,660	17.5	588,632
Russell	94	1,692	18.0	2,200	2,361	49,817	21.1	64,762
Simcoe	71,650	1,733,930	24.2	2,186,486	1,392	21,994	15.8	27,053
Stormont	201	4,221	21.0	5,487	1,238	19,808	16.0	25,750
Sudbury	30	660	22.0	858	1,488	28,421	19.1	36,947
Thunder Bay	69	1,380	20.0	1,766	816	16,973	20.8	22,065
Timis. & Cochrane	70	1,295	18.5	1,684	2,976	54,758	18.4	71,185
Victoria	10,756	268,900	25.0	339,890	3,420	66,348	19.4	79,618
Waterloo	22,851	644,398	28.2	810,653	96	1,440	15.0	1,788
Welland	19,773	381,619	19.3	487,327	233	4,194	18.0	5,243
Wellington	10,962	292,685	26.7	366,734	1,596	29,686	18.6	36,276
Wentworth	16,617	445,336	26.8	560,283	488	9,760	20.0	11,839
York	39,5[illegible]	1,225,337	31.0	1,578,234	3,171	70,396	22.2	88,136
The Province:								
1926	807,015	20,988,030	26.0	26,262,506	115,497	2,166,054	18.8	2,708,690
1925	747,101	22,764,736	30.5	30,420,639	113,338	2,440,632	21.5	3,245,576

OATS AND BARLEY

TABLE VIII.—Showing by County Municipalities of Ontario the area, produce and market value of Oats and Barley for the year 1926, together with the comparative totals for the Province for 1925.

Counties and Districts	Oats				Barley			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
Algoma	14,420	285,516	19.8	171,310	1,751	54,981	31.4	41,236
Brant	33,175	1,234,110	37.2	621,991	4,651	146,972	31.6	98,912
Bruce	113,532	3,110,777	27.4	1,589,607	15,688	498,878	31.8	351,210
Carleton	82,102	2,816,099	34.3	1,607,993	13,602	444,785	32.7	322,024
Dufferin	64,832	1,906,061	29.4	977,809	16,329	501,300	30.7	321,835
Dundas	21,664	747,408	34.5	415,559	5,501	163,380	29.7	126,620
Durham	47,533	1,649,395	34.7	880,777	7,221	225,295	31.2	152,074
Elgin	57,218	2,214,337	38.7	1,073,953	5,347	181,263	33.9	124,709
Essex	80,294	3,019,054	37.6	1,280,079	10,565	338,080	32.0	210,624
Frontenac	38,492	1,174,006	30.5	612,831	3,423	97,213	28.4	70,479
Glengarry	42,251	1,254,855	29.7	672,602	6,785	182,517	26.9	139,443
Grenville	31,667	1,121,012	35.4	630,009	3,007	97,427	32.4	70,927
Grey	150,036	4,231,015	28.2	2,170,511	25,577	869,618	34.0	594,819
Haldimand	39,317	1,266,007	32.2	638,068	5,476	153,328	28.0	108,863
Haliburton	7,853	173,551	22.1	114,717	473	11,447	24.2	8,826
Halton	32,207	1,265,735	39.3	696,154	4,896	163,526	33.4	118,883
Hastings	89,738	2,979,302	33.2	1,725,016	15,534	475,340	30.6	323,231
Huron	129,147	4,675,121	36.2	2,314,185	23,060	797,876	34.6	520,215
Kent	82,153	3,499,718	42.6	1,518,878	18,475	668,795	36.2	417,997
Lambton	88,195	3,651,273	41.4	1,683,237	8,002	292,073	36.5	184,006
Lanark	47,187	1,340,111	28.4	750,462	5,949	165,977	27.9	120,001
Leeds	52,394	1,660,890	31.7	921,794	4,495	132,603	29.5	100,513
Lennox & Add'gton	43,495	1,500,578	34.5	796,807	7,115	229,815	32.3	167,535
Lincoln	26,319	963,275	36.6	519,205	2,955	87,764	29.7	61,435
Manitoulin	7,504	159,835	21.3	103,893	1,090	32,046	29.4	25,637
Middlesex	116,630	4,945,112	42.4	2,259,916	10,781	382,726	35.5	246,476
Muskoka	13,699	330,146	24.1	231,102	413	9,706	23.5	7,765
Nipissing	17,087	430,592	25.2	279,885	1,194	30,447	25.5	24,358
Norfolk	41,994	1,280,817	30.5	664,744	2,100	59,430	28.3	38,570
Northumberland	67,980	2,454,078	36.1	1,339,927	7,480	233,376	31.2	163,830
Ontario	70,730	2,022,878	28.6	1,049,874	14,941	434,783	29.1	283,044
Oxford	73,711	3,147,460	42.7	1,636,679	8,640	321,408	37.2	228,200
Parry Sound	20,301	446,622	22.0	312,635	1,389	34,447	24.8	28,247
Peel	45,447	1,654,271	36.4	863,529	10,691	337,836	31.6	219,931
Perth	95,501	3,590,838	37.6	1,849,282	21,607	771,370	35.7	516,818
Peterborough	56,090	1,654,655	29.5	885,240	8,352	253,066	30.3	168,542
Prescott	49,101	1,615,423	32.9	875,559	6,111	188,219	30.8	138,717
Prince Edward	27,399	975,404	35.6	500,382	8,433	250,460	29.7	176,825
Rainy R. & Kenora	10,626	378,286	35.6	220,541	1,927	60,701	31.5	43,219
Renfrew	76,585	2,297,550	30.0	1,174,048	6,102	159,872	26.2	108,873
Russell	35,083	1,119,148	31.9	608,817	6,470	202,511	31.3	149,656
Simcoe	143,586	4,149,635	28.9	2,161,960	36,272	1,109,923	30.6	714,790
Stormont	29,661	907,627	30.6	510,994	3,954	111,898	28.3	84,483
Sudbury	15,252	268,435	17.6	175,020	1,546	41,897	27.1	33,099
Thunder Bay	9,195	257,460	28.0	147,525	845	28,730	34.0	20,283
Timis. & Cochrane	17,054	404,180	23.7	282,926	2,383	71,490	30.0	57,192
Victoria	61,362	1,767,226	28.8	901,285	12,545	392,659	31.3	261,904
Waterloo	56,985	2,233,812	39.2	1,210,726	6,635	238,860	36.0	168,157
Welland	28,943	868,290	30.0	458,457	2,027	55,945	27.6	40,784
Wellington	104,412	3,696,185	35.4	1,866,573	20,374	692,716	34.0	462,042
Wentworth	41,333	1,570,654	38.0	845,012	3,857	133,452	34.6	89,680
York	83,283	3,356,305	40.3	1,815,761	25,059	826,947	33.0	565,632
The Province:								
1926	2,831,755	95,722,130	33.8	49,615,846	449,095	14,447,174	32.2	9,823,171
1925	2,837,390	118,100,471	41.6	53,404,626	436,383	14,917,247	34.2	10,160,463

PEAS AND BEANS

TABLE IX.—Showing by County Municipalities of Ontario the area, produce and market value of *Peas and Beans for the year 1926, together with the comparative totals for the Province* for 1925.

Counties and Districts	Peas				Beans			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
Algoma	781	16,635	21.3	28,446	43	645	15.0	1,613
Brant	735	11,760	16.0	15,288	454	6,719	14.8	16,999
Bruce	4,924	104,389	21.2	150,320	45	810	18.0	2,106
Carleton	1,347	22,899	17.0	38,012	324	4,536	14.0	11,159
Dufferin	1,680	37,464	22.3	50,202	....	....	....	....
Dundas	58	957	16.5	1,407	69	966	14.0	2,415
Durham	8,687	170,265	19.6	270,721	236	3,304	14.0	8,359
Elgin	1,276	17,864	14.0	30,547	12,410	166,294	13.4	389,128
Essex	1,299	19,485	15.0	31,566	417	7,006	16.8	16,674
Frontenac	251	4,443	17.7	7,153	255	3,570	14.0	8,925
Glengarry	150	2,250	15.0	3,848	109	1,308	12.0	3,335
Grenville	102	2,040	20.0	3,142	120	1,920	16.0	4,800
Grey	5,264	101,069	19.2	138,465	27	405	15.0	1,053
Haldimand	877	14,295	16.3	21,443	90	1,350	15.0	3,240
Haliburton	108	1,501	13.9	2,282	4	40	10.0	100
Halton	212	4,431	20.9	6,203	15	210	14.0	525
Hastings	1,626	28,943	17.8	44,572	131	1,834	14.0	4,585
Huron	4,008	86,974	21.7	127,852	10,243	193,593	18.9	437,520
Kent	1,369	21,356	15.6	42,712	19,614	331,477	16.9	762,397
Lambton	1,453	30,949	21.3	43,638	519	7,785	15.0	18,684
Lanark	927	16,779	18.1	24,497	262	2,882	11.0	7,234
Leeds	127	1,994	15.7	2,851	131	1,310	10.0	2,934
Lennox & Add'gton	710	14,200	20.0	21,442	130	1,560	12.0	4,212
Lincoln	49	794	16.2	1,096	206	4,120	20.0	11,124
Manitoulin	1,348	28,443	21.1	39,251	11	88	8.0	220
Middlesex	1,380	25,116	18.2	31,395	1,340	20,368	15.2	50,716
Muskoka	347	5,066	14.6	8,866	12	144	12.0	360
Nipissing	518	7,304	14.1	11,102	31	310	10.0	775
Norfolk	975	15,600	16.0	24,960	762	9,525	12.5	22,860
Northumberland	3,728	71,578	19.2	108,799	351	5,265	15.0	13,689
Ontario	2,809	50,281	17.9	71,399	82	656	8.0	1,509
Oxford	757	13,020	17.2	17,837	225	2,475	11.0	6,188
Parry Sound	860	16,168	18.8	26,354	9	90	10.0	180
Peel	795	15,582	19.6	21,815	64	896	14.0	2,061
Perth	2,131	48,587	22.8	63,163	118	2,006	17.0	5,135
Peterborough	2,529	44,005	17.4	60,727	75	1,125	15.0	2,813
Prescott	473	7,710	16.3	14,109	313	3,443	11.0	8,470
Prince Edward	4,944	90,970	18.4	158,288	147	1,955	13.3	4,497
Rainy R. & Kenora	572	10,639	18.6	17,980	14	112	8.0	252
Renfrew	12,122	231,530	19.1	377,394	310	3,720	12.0	10,230
Russell	473	6,953	14.7	11,612	187	2,805	15.0	7,209
Simcoe	10,385	220,162	21.2	319,235	106	1,399	13.2	3,498
Stormont	66	990	15.0	1,703	118	1,180	10.0	2,702
Sudbury	854	13,835	16.2	23,243	17	170	10.0	340
Thunder Bay	266	5,586	21.0	8,379	6	48	8.0	108
Timis. & Cochrane	1,873	33,901	18.1	55,259	7	70	10.0	175
Victoria	2,979	52,430	17.6	72,353	54	670	12.4	1,675
Waterloo	725	13,558	18.7	17,625	28	392	14.0	941
Welland	99	1,485	15.0	2,673	1,100	11,000	10.0	32,780
Wellington	3,035	64,646	21.3	86,626	90	1,260	14.0	3,150
Wentworth	425	6,970	16.4	9,061	171	2,565	15.0	6,926
York	2,377	44,450	18.7	62,675	119	1,785	15.0	4,641
The Province:								
1926	97,865	1,880,301	19.2	2,831,588	51,721	819,166	15.8	1,913,221
1925	133,434	2,607,287	19.5	3,532,258	61,080	1,154,317	18.9	2,431,446

RYE AND BUCKWHEAT

TABLE X.—*Showing by County Municipalities of Ontario the area, produce and market value of Rye and Buckwheat for the year 1926, together with the comparative totals for the Province for 1925.*

Counties and Districts	Rye				Buckwheat			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
Algoma	86	1,720	20.0	1,548	171	2,993	17.5	2,394
Brant	5,567	119,134	21.4	105,314	4,090	80,982	19.8	59,927
Bruce	39	546	14.0	482	6,243	129,230	20.7	102,738
Carleton	371	5,936	16.0	5,639	6,075	120,893	19.9	99,737
Dufferin	956	18,451	19.3	16,200	3,993	93,037	23.3	69,220
Dundas	13	195	15.0	176	2,130	53,250	25.0	40,470
Durham	8,587	127,946	14.9	113,104	8,622	183,649	21.3	137,553
Elgin	3,960	78,012	19.7	65,686	5,252	90,334	17.2	69,648
Essex	438	8,848	20.2	7,963	1,737	35,261	20.3	28,738
Frontenac	633	9,748	15.4	8,929	1,705	31,713	18.6	25,561
Glengarry	......	....	....	....	1,323	30,826	23.3	26,079
Grenville	586	12,306	21.0	11,075	5,104	134,746	26.4	106,315
Grey	40	640	16.0	555	5,981	136,965	22.9	102,724
Haldimand	144	2,822	19.6	2,464	3,496	68,522	19.6	56,599
Haliburton	199	2,985	15.0	2,687	448	11,200	25.0	8,803
Halton	163	3,456	21.2	3,052	2,790	55,800	20.0	42,799
Hastings	3,592	61,782	17.2	55,604	8,252	180,719	21.9	142,226
Huron	206	4,326	21.0	3,893	10,679	250,957	23.5	191,731
Kent	1,474	31,691	21.5	26,335	1,701	38,273	22.5	30,350
Lambton	478	9,560	20.0	8,604	451	9,336	20.7	7,824
Lanark	545	8,066	14.8	7,259	5,677	116,379	20.5	91,125
Leeds	451	8,118	18.0	7,306	3,277	71,111	21.7	56,889
Lennox & Add'gton	778	13,226	17.0	12,168	5,867	138,461	23.6	107,723
Lincoln	66	1,320	20.0	1,188	364	6,188	17.0	5,012
Manitouliu	192	3,494	18.2	3,145	469	9,380	20.0	8,161
Middlesex	654	14,715	22.5	12,743	3,642	80,124	22.0	60,333
Muskoka	111	1,665	15.0	1,499	137	2,740	20.0	2,192
Nipissing	54	810	15.0	729	213	4,260	20.0	3,621
Norfolk	12,290	194,182	15.8	167,385	10,227	188,177	18.4	144,332
Northumberland	8,659	148,935	17.2	129,573	15,505	283,742	18.3	208,834
Ontario	5,859	95,502	16.3	83,851	14,991	319,308	21.3	241,716
Oxford	1,813	36,260	20.0	31,256	5,798	134,514	23.2	101,155
Parry Sound	48	816	17.0	734	165	3,020	18.3	2,567
Peel	1,460	31,682	21.7	28,229	2,168	39,674	18.3	30,430
Perth	79	1,580	20.0	1,422	5,480	132,616	24.2	98,534
Peterborough	2,224	38,698	17.4	34,519	4,822	106,566	22.1	82,162
Prescott	31	465	15.0	419	1,360	30,736	22.6	26,433
Prince Edward	2,848	49,270	17.3	42,569	8,195	173,734	21.2	130,474
Rainy R. & Kenora	4	65	16.2	55	2	30	15.0	23
Renfrew	7,181	112,742	15.7	93,125	4,768	94,406	19.8	68,916
Russell	293	4,395	15.0	3,956	1,289	26,682	20.7	22,413
Simcoe	6,583	114,544	17.4	99,424	15,541	340,348	21.9	257,303
Stormont	29	435	15.0	392	2,420	55,902	23.1	47,405
Sudbury	376	6,392	17.0	5,753	465	9,300	20.0	8,370
Thunder Bay	187	2,805	15.0	2,384	49	833	17.0	666
Timis. & Cochrane	129	1,935	15.0	1,742	113	2,068	18.3	1,861
Victoria	828	12,917	15.6	11,625	8,496	183,514	21.6	135,800
Waterloo	1,594	29,967	18.8	27,270	4,444	88,880	20.0	67,193
Welland	262	4,192	16.0	3,731	2,639	36,154	13.7	31,852
Wellington	223	4,192	18.8	3,722	12,342	275,227	22.3	212,200
Wentworth	838	16,928	20.2	14,727	3,852	80,507	20.9	64,245
York	2,134	40,973	19.2	36,630	9,850	201,925	20.5	159,319
The Province:								
1926	86,355	1,501,390	17.4	1,309,840	234,870	4,975,192	21.2	3,830,695
1925	98,652	1,784,625	18.1	1,553,529	257,932	5,579,109	21.6	4,086,236

FLAX AND MIXED GRAINS

TABLE XI.—Showing by County Municipalities of Ontario the area, produce and market value of Flax and Mixed Grains for the year 1926, together with the comparative totals for the Province for 1925.

Counties and Districts	Flax				Mixed Grains			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
Algoma	17	102	6.0	153	1,044	31,946	30.6	22,362
Brant	....	....	....	....	10,531	420,187	39.9	268,079
Bruce	684	7,524	11.0	14,521	24,632	783,298	31.8	522,460
Carleton	9	72	8.0	144	16,245	623,808	38.4	436,666
Dufferin	48	384	8.0	664	24,454	760,519	31.1	489,014
Dundas	....	....	....	....	17,666	616,543	34.9	422,948
Durham	55	550	10.0	1,100	32,626	1,161,486	35.6	718,960
Elgin	....	....	....	....	14,764	624,517	42.3	404,062
Essex	....	....	....	....	8,797	357,158	40.6	232,153
Frontenac	....	....	....	....	4,676	135,604	29.0	95,872
Glengarry	....	....	....	....	2,309	78,044	33.8	53,850
Grenville	36	288	8.0	576	5,921	213,748	36.1	143,852
Grey	318	3,816	12.0	8,319	35,596	1,260,098	35.4	854,346
Haldimand	26	260	10.0	520	9,468	312,444	33.0	202,464
Haliburton	3	24	8.0	48	356	9,327	26.2	7,462
Halton	....	....	....	....	9,828	393,120	40.0	262,211
Hastings	163	1,304	8.0	2,152	11,744	413,389	35.2	299,294
Huron	2,906	27,898	9.6	54,680	42,738	1,790,722	41.9	1,124,573
Kent	....	....	....	....	17,104	749,155	43.8	458,483
Lambton	526	4,734	9.0	9,468	18,968	775,791	40.9	484,869
Lanark	122	1,464	12.0	2,928	11,012	349,080	31.7	240,865
Leeds	....	....	....	....	6,656	245,606	36.9	173,889
Lennox & Add'gton	12	96	8.0	192	6,372	233,852	36.7	154,810
Lincoln	3	24	8.0	48	3,312	127,843	38.6	82,842
Manitoulin	9	90	10.0	135	1,490	46,786	31.4	37,055
Middlesex	116	1,160	10.0	2,227	21,160	861,212	40.7	520,172
Muskoka	1	6	6.0	9	880	23,584	26.8	18,867
Nipissing	11	66	6.0	99	791	19,775	25.0	15,820
Norfolk	81	648	8.0	1,296	7,873	241,701	30.7	145,021
Northumberland	50	600	12.0	1,200	18,147	647,848	35.7	433,410
Ontario	151	1,208	8.0	2,597	43,850	1,354,965	30.9	884,792
Oxford	136	1,360	10.0	2,720	34,693	1,505,676	43.4	1,004,286
Parry Sound	10	60	6.0	90	759	18,975	25.0	15,180
Peel	18	144	8.0	288	16,570	634,631	38.3	436,626
Perth	326	3,260	10.0	6,520	35,603	1,402,758	39.4	907,584
Peterborough	62	496	8.0	918	6,522	191,095	29.3	124,212
Prescott	172	1,376	8.0	2,752	3,208	116,130	36.2	79,085
Prince Edward	49	490	10.0	946	7,149	268,088	37.5	182,032
Rainy R. & Kenora	351	3,896	11.1	7,208	90	3,186	35.4	2,230
Renfrew	109	654	6.0	1,262	5,066	143,874	28.4	104,596
Russell	41	328	8.0	597	5,872	199,061	33.9	137,750
Simcoe	194	1,940	10.0	3,938	37,594	1,225,564	32.6	861,571
Stormont	15	120	8.0	240	6,332	217,821	34.4	159,009
Sudbury	78	780	10.0	1,170	469	12,194	26.0	9,755
Thunder Bay	....	....	....	....	510	16,320	32.0	12,240
Timis. & Cochrane	113	1,356	12.0	2,712	1,132	29,432	26.0	23,546
Victoria	87	870	10.0	1,653	16,534	552,236	33.4	331,342
Waterloo	62	620	10.0	1,110	35,242	1,501,309	42.6	989,363
Welland	27	216	8.0	393	3,318	105,844	31.9	70,386
Wellington	364	3,640	10.0	6,588	60,530	2,160,921	35.7	1,324,645
Wentworth	....	....	....	....	18,462	712,633	38.6	472,476
York	151	1,812	12.0	3,968	44,316	1,896,725	42.8	1,238,561
The Province:								
1926	7,712	75,736	9.8	148,149	770,981	28,577,629	37.1	18,697,998
1925	9,789	123,134	12.6	262,386	681,624	28,246,057	41.4	16,559,729

CORN

TABLE XII.—Showing by County Municipalities of Ontario the area, produce, and market value of Corn for husking and for fodder for the year 1926, together with the comparative totals for the Province for 1925.

Counties and Districts	Corn for Husking				Corn for Silo			
	Acres	Bushels (in the ear)	Per acre	Market value	Acres	Tons green	Per acre	Market value
				$				$
Algoma	98	2,450	25.0	1,348	265	1,590	6.00	7,155
Brant	3,187	233,926	73.4	133,338	9,052	88,438	9.77	397,971
Bruce	365	14,600	40.0	8,526	6,150	46,371	7.54	208,670
Carleton	1,163	46,520	40.0	27,307	15,865	188,794	11.90	849,573
Dufferin	30	900	30.0	510	918	8,262	9.00	37,179
Dundas	1,288	51,520	40.0	30,912	11,603	98,626	8.50	443,817
Durham	1,365	68,250	50.0	40,950	7,093	61,638	8.69	277,371
Elgin	12,934	831,656	64.3	459,906	17,224	140,203	8.14	630,913
Essex	45,106	2,652,233	58.8	1,254,506	5,333	50,930	9.55	229,185
Frontenac	1,267	57,015	45.0	33,810	4,379	30,434	6.95	136,953
Glengarry	730	21,900	30.0	14,235	5,874	54,335	9.25	244,507
Grenville	1,242	68,310	55.0	40,986	6,544	78,528	12.00	353,376
Grey	220	8,800	40.0	5,025	7,954	72,779	9.15	327,505
Haldimand	1,807	90,350	50.0	53,487	3,724	32,846	8.82	147,807
Haliburton	110	3,300	30.0	1,980	149	894	6.00	4,023
Halton	372	18,600	50.0	11,160	4,487	55,639	12.40	250,375
Hastings	2,637	145,035	55.0	87,021	8,804	82,582	9.38	371,619
Huron	1,192	59,600	50.0	35,522	9,066	94,830	10.46	426,735
Kent	32,435	1,972,048	60.8	997,856	12,165	91,967	7.56	413,851
Lambton	14,748	890,779	60.4	525,560	15,428	145,023	9.40	652,603
Lanark	919	22,975	25.0	14,934	7,945	65,546	8.25	294,957
Leeds	3,328	183,040	55.0	108,726	11,284	98,171	8.70	441,770
Lennox & Add'gton	1,628	71,632	44.0	42,979	4,864	37,550	7.72	168,975
Lincoln	2,719	214,801	79.0	122,437	5,037	48,254	9.58	217,143
Manitoulin	72	1,800	25.0	1,080	719	6,320	8.79	28,440
Middlesex	8,011	400,550	50.0	208,687	25,619	272,586	10.64	1,226,637
Muskoka	106	3,180	30.0	1,908	371	2,334	6.29	10,503
Nipissing	109	2,725	25.0	1,499	55	550	10.00	2,475
Norfolk	14,282	889,769	62.3	485,814	8,976	76,296	8.50	343,332
Northumberland	2,293	112,357	49.0	67,414	8,734	72,492	8.30	326,214
Ontario	838	25,140	30.0	15,084	10,751	90,953	8.46	409,288
Oxford	3,460	259,500	75.0	139,611	25,550	243,492	9.53	1,095,714
Parry Sound	55	1,375	25.0	825	162	1,620	10.00	7,290
Peel	83	2,490	30.0	1,370	4,684	44,123	9.42	198,553
Perth	357	21,420	60.0	12,381	11,464	130,919	11.42	589,135
Peterborough	394	15,760	40.0	8,668	4,865	42,180	8.67	189,810
Prescott	1,735	69,400	40.0	45,110	6,458	59,414	9.20	267,363
Prince Edward	3,988	219,340	55.0	131,604	4,879	43,911	9.00	197,600
Rainy R. & Kenora	21	525	25.0	289	145	1,160	8.00	5,220
Renfrew	836	25,080	30.0	16,302	4,434	41,192	9.29	185,364
Russell	900	36,000	40.0	23,400	7,014	75,751	10.80	340,880
Simcoe	1,013	40,520	40.0	21,881	7,615	64,118	8.42	288,531
Stormont	1,163	34,890	30.0	22,679	7,311	67,919	9.29	305,636
Sudbury	29	725	25.0	435	155	1,240	8.00	5,580
Thunder Bay	....	....	....	....	....	....	....	....
Timis. & Cochrane	....	....	....	....	33	198	6.00	891
Victoria	449	13,470	30.0	7,678	5,917	48,519	8.20	218,336
Waterloo	336	10,080	30.0	5,796	9,183	113,869	12.40	512,411
Welland	5,650	298,885	52.9	190,988	4,887	42,615	8.72	191,768
Wellington	481	19,240	40.0	10,697	7,630	73,477	9.63	330,647
Wentworth	1,365	73,710	54.0	42,236	8,441	93,104	11.03	418,968
York	409	21,268	52.0	12,612	10,513	112,489	10.70	506,201
The Province:								
1926	179,325	10,329,439	57.6	5,529,069	367,772	3,497,071	9.51	15,736,820
1925	207,767	14,604,467	70.3	8,131,617	373,133	3,614,233	9.69	15,360,490

POTATOES AND TURNIPS

TABLE XIII.—Showing by County Municipalities of Ontario the area, produce and market value of Potatoes and Turnips for the year 1926, together with the comparative totals for the Province for 1925.

Counties and Districts	Potatoes				Turnips			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
Algoma	1,219	113,977	93.5	133,923	273	51,870	190	10,374
Brant	2,483	175,548	70.7	227,159	2,158	640,926	297	128,185
Bruce	3,694	426,288	115.4	374,281	2,648	707,016	267	141,403
Carleton	4,925	533,378	108.3	601,117	872	234,568	269	46,914
Dufferin	4,415	588,078	133.2	410,478	2,033	689,187	339	137,838
Dundas	1,458	112,703	77.3	146,965	59	19,293	327	3,859
Durham	3,482	367,351	105.5	394,535	2,096	509,328	243	101,866
Elgin	2,945	311,287	105.7	435,179	191	28,650	150	5,730
Essex	2,567	339,614	132.3	471,384	35	9,625	275	1,925
Frontenac	3,063	234,932	76.7	302,592	113	26,668	236	5,334
Glengarry	2,473	193,636	78.3	223,650	89	26,700	300	5,340
Grenville	2,440	256,200	105.0	330,242	177	35,400	200	7,080
Grey	5,483	781,328	142.5	701,633	3,250	1,186,250	365	237,250
Haldimand	778	72,899	93.7	106,651	32	8,480	265	1,696
Haliburton	478	54,683	114.4	61,682	95	27,740	292	5,548
Halton	1,385	108,446	78.3	135,449	1,312	469,696	358	93,939
Hastings	4,833	625,874	129.5	756,682	714	261,324	366	52,265
Huron	3,656	542,916	148.5	551,060	3,505	1,083,045	309	216,609
Kent	3,717	398,091	107.1	539,811	55	16,500	300	3,300
Lambton	3,276	353,808	108.0	453,936	190	38,000	200	7,600
Lanark	2,588	222,827	86.1	266,278	560	128,240	229	25,648
Leeds	2,550	180,285	70.7	251,137	497	140,651	283	28,130
Lennox & Add'gton	2,732	207,905	76.1	253,020	90	14,850	165	2,970
Lincoln	1,022	95,455	93.4	137,360	78	23,400	300	4,680
Manitoulin	553	67,466	122.0	55,390	90	24,120	268	4,824
Middlesex	6,221	745,276	119.8	885,388	1,263	284,175	225	56,835
Muskoka	1,151	148,709	129.2	165,811	314	91,060	290	18,212
Nipissing	1,370	143,850	105.0	171,325	328	94,136	287	18,827
Norfolk	3,226	354,860	110.0	448,188	495	120,285	243	24,057
Northumberland	3,552	401,021	112.9	496,063	2,092	587,852	281	117,571
Ontario	5,879	611,416	104.0	606,525	6,344	2,379,000	375	475,800
Oxford	2,398	270,255	112.7	379,979	4,149	1,360,872	328	272,174
Parry Sound	1,388	172,390	124.2	196,525	452	141,476	313	28,295
Peel	3,860	368,630	95.5	380,795	992	354,144	357	70,829
Perth	2,740	346,336	126.4	423,223	3,021	996,930	330	199,386
Peterborough	2,430	271,188	111.6	320,273	1,585	499,275	315	99,855
Prescott	2,290	245,030	107.0	264,632	234	76,752	328	15,350
Prince Edward	1,580	144,886	91.7	190,090	94	28,200	300	5,640
Rainy R. & Kenora	820	116,932	142.6	107,811	141	41,454	294	8,291
Renfrew	4,583	407,887	89.0	481,307	332	87,980	265	17,596
Russell	1,720	115,068	66.9	138,082	685	173,305	253	34,661
Simcoe	10,297	1,206,808	117.2	1,110,263	5,054	1,637,496	324	327,499
Stormont	1,596	134,383	84.2	169,054	38	9,500	250	1,900
Sudbury	1,649	209,588	127.1	223,840	289	76,007	263	15,201
Thunder Bay	1,750	288,750	165.0	317,625	335	117,250	350	23,450
Timis. & Cochrane	1,057	112,571	106.5	153,885	351	94,770	270	18,954
Victoria	1,838	200,342	109.0	226,186	2,350	817,800	348	163,560
Waterloo	2,839	327,053	115.2	430,729	3,770	1,492,920	396	298,584
Welland	1,854	137,938	74.4	219,735	52	15,600	300	3,120
Wellington	4,878	520,483	106.7	511,635	8,780	2,853,500	325	570,700
Wentworth	4,667	363,093	77.8	493,806	1,551	421,872	272	84,374
York	7,620	766,572	100.6	793,402	5,197	1,948,875	375	389,775
The Province:								
1926	153,468	16,496,290	107.5	18,627,771	71,500	23,204,013	325	4,640,803
1925	163,790	15,714,786	95.9	21,513,125	73,318	28,015,466	382	5,042,784

MANGELS AND SUGAR BEETS

TABLE XIV.—Showing by County Municipalities of Ontario the area, produce and market value of Mangels and Sugar Beets for the year 1926, together with the comparative totals for the Province for 1925.

Counties and Districts	Mangels				Sugar Beets			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
Algoma	19	4,275	225	855	26	4,550	175	910
Brant	867	321,657	371	64,332	35	8,750	250	1,750
Bruce	1,688	467,576	277	93,515	85	17,000	200	3,400
Carleton	351	78,273	223	15,655	149	14,900	100	2,980
Dufferin	242	94,138	389	18,828	97	27,645	285	5,529
Dundas	37	13,801	373	2,760	53	15,900	300	3,180
Durham	917	331,954	362	66,391	28	5,600	200	1,120
Elgin	305	157,685	517	31,537	661	319,263	483	63,853
Essex	512	204,800	400	40,960	4,028	1,683,704	418	336,741
Frontenac	92	24,472	266	4,894	47	9,635	205	1,927
Glengarry	23	6,900	300	1,380	6	1,200	200	240
Grenville	36	10,800	300	2,160	50	9,150	183	1,830
Grey	1,758	625,848	356	125,169	132	39,600	300	7,920
Haldimand	143	59,202	414	11,840	22	6,600	300	1,320
Haliburton	8	2,400	300	480	6	900	150	180
Halton	857	407,075	475	81,415	18	5,400	300	1,080
Hastings	99	27,225	275	5,445	95	28,500	300	5,700
Huron	2,522	1,170,208	464	234,042	53	15,900	300	3,180
Kent	342	168,264	492	33,653	26,769	12,875,889	481	2,575,178
Lambton	343	154,350	450	30,870	7,157	3,120,452	436	624,090
Lanark	132	33,132	251	6,626	59	11,800	200	2,360
Leeds	103	30,694	298	6,139	116	34,800	300	6,960
Lennox & Add'gton	84	12,600	150	2,520	36	5,400	150	1,080
Lincoln	182	92,456	508	18,491	59	27,317	463	5,463
Manitoulin	33	8,877	269	1,775	3	600	200	120
Middlesex	1,154	500,836	434	100,167	495	181,170	366	36,234
Muskoka	26	9,750	375	1,950	12	3,600	300	720
Nipissing	21	4,200	200	840	14	1,400	100	280
Norfolk	319	118,030	370	23,606	146	58,400	400	11,680
Northumberland	475	180,500	380	36,100	74	23,384	316	4,677
Ontario	2,492	867,216	348	173,443	39	9,750	250	1,950
Oxford	2,137	940,280	440	188,056	44	17,600	400	3,520
Parry Sound	31	7,750	250	1,550	18	3,600	200	720
Peel	588	249,900	425	49,980	30	6,000	200	1,200
Perth	2,502	1,013,310	405	202,662	14	4,900	350	980
Peterborough	403	141,050	350	28,210	30	6,000	200	1,200
Prescott	80	30,720	384	6,144	102	20,400	200	4,080
Prince Edward	39	9,750	250	1,950	20	2,000	100	400
Rainy R. & Kenora	48	9,600	200	1,920	33	6,600	200	1,320
Renfrew	215	58,695	273	11,739	70	8,750	125	1,750
Russell	194	58,200	300	11,640	39	7,800	200	1,560
Simcoe	1,954	721,026	369	144,205	252	75,600	300	15,120
Stormont	45	13,500	300	2,700	26	5,200	200	1,040
Sudbury	32	8,224	257	1,645	39	7,800	200	1,560
Thunder Bay	27	8,100	300	1,620	11	1.100	100	220
Timis. & Cochrane	42	10,500	250	2,100	27	4,050	150	810
Victoria	743	286,798	386	57,360	33	9,900	300	1,980
Waterloo	2,198	907,774	413	181,555	....	....	....	....
Welland	50	20,000	400	4,000	55	19,250	350	3,850
Wellington	2,336	978,784	419	195,757	65	19,500	300	3,900
Wentworth	1,089	502,029	461	100,406	33	9,900	300	1,980
York	3,074	1,383,300	450	276,660	83	26,975	325	5,395
The Province:								
1926	34,009	13,548,484	398	2,709,697	41,594	18,831,084	453	3,766,217
1925	35,385	14,881,069	421	2,678,592	37,718	16,686,713	442	3,003,608

ALSIKE AND SWEET CLOVER

Table XV.—Showing by County Municipalities of Ontario the area, produce and market value of *Alsike and Sweet Clover for the year 1926, together with the comparative totals for the* Province for 1925.

Counties and Districts	Alsike				Sweet Clover			
	Acres	Tons	Per acre	Market value	Acres	Tons	Per acre	Market value
				$				$
Algoma	173	277	1.60	3,692	254	508	2.00	5.080
Brant	877	1,158	1.32	16,015	4,336	9,539	2.20	100,827
Bruce	2,774	4,022	1.45	46,253	20,733	40,637	1.96	350,291
Carleton	1,047	1,696	1.62	21,200	5,420	11,545	2.13	115,450
Dufferin	*2,365*	*3,689*	*1.56*	*53,048*	*8,834*	*19,258*	*2.18*	*206,253*
Dundas	580	638	1.10	5,927	2,618	5,969	2.28	41,783
Durham	3,484	4,738	1.36	63,063	18,240	36,480	2.00	288,192
Elgin	1,727	2,487	1.44	35,092	7,798	17,234	2.21	168,893
Essex	2,658	3,323	1.25	49,280	5.304	12,305	2.32	132,279
Frontenac	963	1,541	1.60	17,983	1,757	3,953	2.25	39,530
Glengarry	1,033	1,508	1.46	12,366	1,842	4,145	2.25	33,160
Grenville	420	735	1.75	7,034	3,685	8,844	2.40	61,908
Grey	2,671	3,686	1.38	40,730	30,397	65,354	2.15	563,351
Haldimand	15,619	18,118	1.16	212,887	2,875	5,750	2.00	53,935
Haliburton	164	205	1.25	3,075	360	810	2.25	8,100
Halton	4,725	7,324	1.55	109,860	2,717	6,113	2.25	69,260
Hastings	5,180	7,459	1.44	82,049	12,486	29,092	2.33	215,863
Huron	2,534	3,649	1.44	41,015	18,670	42,194	2.26	365,822
Kent	2,267	2,834	1.25	38,401	5,570	12,755	2.29	133.928
Lambton	3,410	5,286	1.55	58,833	13,440	34,272	2.55	308,448
Lanark	1,688	2,431	1.44	27,957	4,942	11,120	2.25	85,290
Leeds	792	990	1.25	11,326	2,822	6,350	2.25	57,150
Lennox & Add'gton	1,682	2,304	1.37	24,123	3,910	8,680	2.22	61,888
Lincoon	2,348	2,935	1.25	48,251	1,450	3,147	2.17	36,725
Manitoulin	317	412	1.30	4.062	1,606	3,212	2.00	27,302
Middlesex	4,123	6,267	1.52	81,972	15,089	33,648	2.23	340,518
Muskoka	322	435	1.35	4,785	76	152	2.00	1,064
Nipissing	432	540	1.25	6,480	142	284	2.00	2,272
Norfolk	2,665	3,331	1.25	45,135	5,970	11,343	1.90	118,194
Northumberland	3,532	5,298	1.50	58,755	20,007	47,417	2.37	367,482
Ontario	4,148	5,185	1.25	63,361	14,833	32,633	2.20	290,434
Oxford	1,272	1,933	1.52	25,322	6,450	14,190	2.20	135,798
Parry Sound	228	331	1.45	3,972	355	710	2.00	4,970
Peel	4,481	6,408	1.43	76,896	6,780	16,136	2.38	164,426
Perth	856	1,258	1.47	16,253	12,325	28,224	2.29	265,306
Peterborough	2,247	2,584	1.15	31,861	12,669	26,352	2.08	203,437
Prescott	731	1,133	1.55	10,322	2,080	4,160	2.00	35,360
Prince Edward	3,299	4,124	1.25	38,683	6,556	15,800	2.41	120,080
Rainy R. & Kenora	1;303	1,707	1.31	22,976	392	800	2.04	8,000
Renfrew	1,043	1,669	1.60	15,989	3,328	6,656	2.00	49,388
Russell	978	1,467	1.50	14,670	912	2,016	2.21	18,144
Simcoe	9,274	13,355	1.44	152,915	28,679	68,256	2.38	604,748
Stormont	654	981	1.50	9,810	1,716	4,118	2.40	35,003
Sudbury	857	1,183	1.38	14,563	407	814	2.00	6,512
Thunder Bay	475	475	1.00	7,600	470	823	1.75	9,876
Timis. & Cochrane	2,112	3,020	1.43	37,750	310	620	2.00	4,960
Victoria	9,273	14,373	1.55	197,054	8,734	18,341	2.10	129,854
Waterloo	365	562	1.54	9,110	5,861	12,191	2.08	152,022
Welland	2,525	3,131	1.24	41,110	1,442	2,740	1.90	30,140
Wellington	1,489	2,085	1.40	27,459	12,315	26,970	2.19	252,979
Wentworth	2,726	3,925	1.44	52,791	2,790	6,557	2.35	59,013
York	6,569	9,459	1.44	116,440	12,348	29,635	2.40	281,533
The Province:								
1926	129,477	179,664	1.39	2,217,556	365,102	810,852	2.22	7,222,221
1925	177,382	259,649	1.46	2,855,850	344,114	792,340	2.30	7,144,050

ALFALFA AND HAY AND CLOVER

TABLE XVI.—Showing by County Municipalities of Ontario the area, produce and market value of Alfalfa, Hay and Clover for the year 1926, together with the comparative totals for the Province for 1925.

Counties and Districts	Alfalfa				Hay and Clover			
	Acres	Tons	Per acre	Market value	Acres	Tons	Per acre	Market value
				$				$
Algoma	406	914	2.25	12,796	26,317	41,581	1.58	481,924
Brant	12,577	29,430	2.34	462,934	24,564	36,600	1.49	538,386
Bruce	55,654	122,439	2.20	1,569,668	95,065	122,634	1.29	1,467,929
Carleton	5,694	13,779	2.42	190,977	104,966	172,144	1.64	1,903,913
Dufferin	6,574	16,041	2.44	249,277	57,536	78,824	1.37	1,098,807
Dundas	3,181	8,461	2.66	83,425	56,798	91,445	1.61	878,786
Durham	7,494	17,761	2.37	216,507	38,823	61,340	1.58	816,435
Elgin	16,707	42,770	2.56	665,929	61,626	81,346	1.32	1,148,606
Essex	21,703	53,389	2.46	885,724	36,491	43,424	1.19	762,525
Frontenac	4,769	11,732	2.46	139,611	80,177	105,032	1.31	1,176,358
Glengarry	3,186	7,646	2.40	68,814	64,278	96,417	1.50	895,714
Grenville	1,761	4,403	2.50	46,055	52,074	84,360	1.62	862,159
Grey	64,249	149,058	2.32	1,852,791	124,746	162,170	1.30	1,936,310
Haldimand	35,904	94,068	2.62	1,294,376	43,504	53,945	1.24	654,892
Haliburton	95	190	2.00	2,850	13,996	19,454	1.39	310,486
Halton	23,180	57,950	2.50	960,811	23,312	38,465	1.65	609,670
Hastings	20,968	53,049	2.53	646,667	86,322	136,389	1.58	1,587,568
Huron	41,749	108,130	2.59	1,371,088	103,144	150,590	1.46	1,834,186
Kent	23,461	60,529	2.58	1,005,387	42,463	61,571	1.45	941,421
Lambton	40,838	104,137	2.55	1,301,713	60,315	90,473	1.50	1,125,484
Lanark	6,346	14,405	2.27	167,530	76,073	120,956	1.59	1,302,696
Leeds	3,553	8,456	2.38	97,244	76,778	115,167	1.50	1,387,762
Lennox & Add'gton	11,365	30,231	2.66	368,818	68,549	108,993	1.59	1,140,067
Lincoln	17,621	47,577	2.70	832,598	34,617	47,079	1.36	784,807
Manitoulin	2,265	5,345	2.36	58,154	17,463	22,702	1.30	236,101
Middlesex	34,612	86,184	2.49	1,208,300	91,977	141,645	1.54	1,902,292
Muskoka	124	248	2.00	2,976	29,154	45,189	1.55	691,392
Nipissing	102	204	2.00	2,601	28,220	36,968	1.31	545,278
Norfolk	13,427	33,030	2.46	525,177	44,522	60,550	1.36	888,874
Northumberland	10,709	24,845	2.32	314,041	49,534	81,731	1.65	950,532
Ontario	15,983	39,478	2.47	537,690	57,909	83,389	1.44	1,089,060
Oxford	28,458	73,991	2.60	1,054,372	58,801	97,610	1.66	1,324,568
Parry Sound	321	642	2.00	7,704	36,046	51,546	1.43	767,004
Peel	45,353	111,115	2.45	1,548,943	31,293	50,069	1.60	760,548
Perth	10,114	25,791	2.55	385,318	92,217	139,248	1.51	1,906,305
Peterborough	5,696	13,272	2.33	174,394	42,559	62,987	1.48	825,760
Prescott	1,844	3,688	2.00	47,944	71,348	114,157	1.60	1,034,262
Prince Edward	9,815	25,519	2.60	287,854	36,168	55,699	1.54	593,751
Rainy R. & Kenora	1,115	2,375	2.13	36,219	25,494	32,122	1.26	497,891
Renfrew	4,008	9,339	2.33	102,075	101,342	151,000	1.49	1,608,150
Russell	1,809	4,703	2.60	58,788	53,646	75,641	1.41	742,038
Simcoe	24,095	63,852	2.65	902,229	97,554	148,282	1.52	2,049,257
Stormont	1,808	4,737	2.62	54,476	51,469	82,865	1.61	863,453
Sudbury	237	474	2.00	6,399	27,538	40,205	1.46	586,189
Thunder Bay	832	1,664	2.00	29,403	20,417	26,134	1.28	483,479
Timis. & Cochrane	152	304	2.00	4,095	29,506	39,833	1.35	592,715
Victoria	5,163	12,546	2.43	164,729	49,020	69,608	1.42	925,786
Waterloo	9,691	24,228	2.50	418,902	47,365	75,784	1.60	1,302,727
Welland	8,016	19,078	2.38	333,865	49,269	57,645	1.17	930,390
Wellington	18,940	47,161	2.49	767,781	110,652	159,339	1.44	2,453,821
Wentworth	21,086	49,130	2.33	753,654	36,490	49,262	1.35	735,974
York	43,663	110,904	2.54	1,608,108	49,636	76,439	1.54	1,219,966
The Province:								
1926	748,473	1,850,392	2.47	25,889,781	2,889,143	4,248,048	1.47	54,154,454
1925	550,645	1,397,462	2.54	19,306,047	3,022,507	4,181,206	1.38	50,738,655

CARROTS—ALL FIELD CROPS

TABLE XVII.—*Showing by County Municipalities of Ontario the area, produce and market* value of Carrots and all Field Crops enumerated in Tables VII to XVII for the year 1926, together with the comparative totals for the Province for 1925.

Counties and Districts	Carrots				All Field Crops		
	Acres	Bushels	Per acre	Market value	Acres	Value	Per Acre
				$		$	$ c.
Algoma	43	4,945	115	989	48,954	972,371	19.86
Brant	15	2,250	150	450	136,915	3,840,089	28.05
Bruce	17	1,700	100	340	383,643	7,791,595	20.31
Carleton	81	8,100	100	1,620	267,461	6,478,304	24.22
Dufferin	5	1,000	200	200	199,452	4,248,028	21.30
Dundas	13	2,600	200	520	125,999	2,679,452	21.27
Durham	23	4,600	200	920	215,009	5,032,034	23.40
Elgin	21	3,150	150	630	249,574	6,682,347	26.78
Essex	53	10,600	200	2,120	288,658	7,865,543	27.25
Frontenac	55	8,580	156	1,716	148,047	2,735,786	18.48
Glengarry	23	3,450	150	690	137,607	2,516,573	18.29
Grenville	22	3,300	150	660	115,462	2,695,679	23.35
Grey	23	2,300	100	460	491,595	10,361,870	21.08
Haldimand	25	3,750	150	750	185,184	4,309,846	23.27
Haliburton	11	1,650	150	330	24,958	544,576	21.82
Halton	13	2,600	200	520	125,784	3,966,003	31.53
Hastings	27	4,050	150	810	280,137	6,603,631	23.57
Huron	32	9,600	300	1,920	448,077	11,059,932	24.68
Kent	10	2,000	200	400	370,872	12,519,508	33.76
Lambton	49	4,900	100	980	334,446	9,517,840	28.46
Lanark	25	2,500	100	500	179,269	3,591,368	20.03
Leeds	46	6,900	150	1,380	171,040	3,708,026	21.68
Lennox and Addington	35	3,500	100	700	164,003	3,451,792	21.05
Lincoln	27	6,534	242	1,307	112,878	3,304,087	29.27
Manitoulin	6	1,200	200	240	37,319	679,692	18.21
Middlesex	52	10,400	200	2,080	401,726	11,283,922	28.09
Muskoka	31	5,425	175	1,085	47,531	1,177,444	24.77
Nipissing	36	7,200	200	1,440	51,525	1,103,715	21.42
Norfolk	39	3,900	100	780	193,961	4,867,144	25.09
Northumberland	28	5,600	200	1,120	243,762	5,754,156	23.61
Ontario	47	7,050	150	1,410	295,787	6,971,717	23.57
Oxford	5	1,000	200	200	293,348	8,881,301	30.28
Parry Sound	25	4,375	175	875	62,990	1,413,962	22.45
Peel	44	5,500	125	1,100	191,634	5,433,704	28.35
Perth	6	1,200	200	240	327,342	8,513,504	26.01
Peterborough	20	2,000	100	400	170,548	3,736,560	21.91
Prescott	66	8,250	125	1,650	150,764	2,959,040	19.63
Prince Edward	6	600	100	120	130,712	2,891,888	22.12
Rainy River and Kenora	8	1,200	150	240	43,685	998,601	22.86
Renfrew	50	7,500	150	1,500	259,771	5,026,684	19.35
Russell	80	8,000	100	1,600	120,140	2,394,435	19.93
Simcoe	80	13,360	167	2,672	509,170	12,254,578	24.07
Stormont	28	4,200	150	840	109,888	2,304,756	20.97
Sudbury	49	6,125	125	1,225	51,856	1,157,704	22.33
Thunder Bay	26	2,600	100	520	36,286	1,089,209	30.02
Timiskaming and Cochrane	51	5,100	100	1,020	59,491	1,315,462	22.11
Victoria	35	7,000	200	1,400	200,616	4,231,068	21.09
Waterloo	16	2,400	150	480	210,286	6,607,142	31.42
Welland	34	5,100	150	1,020	132,255	3,083,612	23.32
Wellington	11	2,200	200	440	381,505	9,494,372	24.89
Wentworth	33	6,600	200	1,320	166,314	4,818,721	28.97
York	66	14,322	217	2,864	349,165	10,766,513	30.84
The Province:							
1926	1,672	253,966	152	50,793	10,434,401	257,686,886	24.70
1925	1,835	325,478	177	58,586	10,364,317	261,490,292	25.23

PASTURE, FALLOW, ORCHARD, SMALL FRUITS

TABLE XVIII.—Showing by County Municipalities the area in Cleared Pasture, Summer Fallow, Orchards and Small Fruits in 1926, together with totals for the Province for the past five years; also, the number of silos in each county in 1926.

Counties and Districts	Cleared pasture	Summer fallow	Orchard	Small fruits	Total	No. of silos
	Acres	Acres	Acres	Acres	Acres	
Algoma	8,798	805	324	94	10,021	30
Brant	24,293	2,740	3,754	624	31,411	813
Bruce	141,246	12,723	7,172	340	161,481	789
Carleton	86,713	400	1,608	254	88,975	1,470
Dufferin	55,079	4,483	1,988	126	61,676	108
Dundas	43,432	154	1,432	193	45,211	969
Durham	59,788	3,683	6,885	409	70,765	684
Elgin	76,695	2,158	6,981	969	86,803	1,291
Essex	39,372	2,266	5,974	1,129	48,741	398
Frontenac	79,608	345	1,252	190	81,395	410
Glengarry	47,365	69	932	136	48,502	623
Grenville	49,326	357	1,347	281	51,311	507
Grey	143,902	11,466	10,185	478	166,031	1,110
Haldimand	34,460	8,037	4,582	303	47,382	510
Haliburton	16,125	219	91	27	16,462	6
Halton	27,919	2,846	5,693	935	37,393	614
Hastings	110,510	1,262	5,143	488	117,403	593
Huron	162,313	5,975	12,190	563	181,041	1,257
Kent	73,423	2,466	5,355	1,041	82,285	691
Lambton	145,300	3,963	11,254	1,043	161,560	1,435
Lanark	114,332	252	1,143	263	115,990	1,145
Leeds	78,574	173	1,397	347	80,491	1,155
Lennox and Addington	71,282	1,621	1,739	327	74,969	307
Lincoln	19,390	4,997	11,141	5,181	40,709	516
Manitoulin	9,410	215	195	15	9,835	64
Middlesex	204,977	4,996	11,249	1,122	222,344	2,207
Muskoka	16,719	349	117	70	17,255	31
Nipissing	10,880	321	50	93	11,344	13
Norfolk	42,544	5,154	9,258	1,500	58,456	968
Northumberland	69,461	4,793	10,989	760	86,003	744
Ontario	59,681	3,256	5,554	486	68,977	1,528
Oxford	73,522	1,996	7,760	612	83,890	2,398
Parry Sound	17,460	667	100	76	18,303	29
Peel	46,063	5,663	4,493	885	57,104	701
Perth	91,622	9,118	5,627	311	106,678	1,090
Peterborough	62,878	3,302	1,675	195	68,050	604
Prescott	52,212	....	744	159	53,115	586
Prince Edward	43,863	1,116	7,759	322	53,060	253
Rainy River and Kenora	6,186	172	16	39	6,413	7
Renfrew	90,850	1,831	699	219	93,599	590
Russell	35,926	....	470	111	36,507	634
Simcoe	95,934	31,451	8,461	986	136,832	1,336
Stormont	44,328	29	1,045	177	45,579	686
Sudbury	7,985	171	24	41	8,221	7
Thunder Bay	4,677	234	55	48	5,014	12
Timiskaming and Cochrane	7,729	606	16	44	8,395	4
Victoria	62,553	2,914	1,831	254	67,552	676
Waterloo	27,180	4,874	4,143	353	36,550	1,255
Welland	21,927	9,225	5,573	1,304	38,029	574
Wellington	83,988	6,025	5,009	392	95,414	910
Wentworth	25,846	4,679	5,361	1,511	37,397	1,131
York	51,778	12,871	7,944	665	73,258	1,702
The Province:						
1926	3,077,424	189,488	215,779	*28,491	3,511,182	38,171
1925	3,193,941	162,649	223,343	*27,890	3,607,823	37,836
1924	3,317,532	179,527	229,708	27,315	3,754,082	37,218
1923	3,472,642	186,123	235,349	27,497	3,921,611	......
1922	3,401,033	198,841	239,914	27,242	3,867,030	......

*Including 7,274 acres in strawberries and 7,545 in vineyards in 1926, and 7,185 acres in strawberries and 6,558 in vineyards in 1925.

MARKET PRICES

TABLE XIX.—The following table shows by Counties the average prices of agricultural products for 1926, together with the average price for 1925.

Counties and Districts	Fall Wheat, per bush.	Spring Wheat, per bush.	Oats, per bush.	Barley, per bush.	Peas, per bush.	Beans, per bush.	Rye, per bush.	Buckwheat, per bush.	Corn (in car) per bush.	Hay, per ton	Potatoes, per bush.
	cts.	cts.	cts.	cts.	cts.	$ c.	cts.	cts.	cts.	$ c.	cts.
Algoma	130.0	130.0	60.0	75.0	171.0	2 50	90.0	80.0	55.0	11 59	117.5
Brant	126.2	121.7	50.4	67.3	130.0	2 53	88.4	74.0	57.0	14 71	129.4
Bruce	125.6	125.6	51.1	70.4	144.0	2 60	88.3	79.5	58.4	11 97	87.8
Carleton	130.0	130.0	57.1	72.4	166.0	2 46	95.0	82.5	58.7	11 06	112.7
Dufferin	125.0	125.0	51.3	64.2	134.0	.....	87.8	74.4	56.7	13 94	69.8
Dundas	123.3	123.9	55.6	77.5	147.0	2 50	90.0	76.0	60.0	9 61	130.4
Durham	125.9	121.4	53.4	67.5	159.0	2 53	88.4	74.9	60.0	13 31	107.4
Elgin	123.4	124.0	48.5	68.8	171.0	2 34	84.2	77.1	55.3	14 12	139.8
Essex	122.5	119.0	42.4	62.3	162.0	2 38	90.0	81.5	47.3	17 56	138.8
Frontenac	129.0	129.4	52.2	72.5	161.0	2 50	91.6	80.6	59.3	11 20	128.8
Glengarry	130.0	123.0	53.6	76.4	171.0	2 55	.....	84.6	65.0	9 29	115.5
Grenville	123.8	122.7	56.2	72.8	154.0	2 50	90.0	78.9	60.0	10 22	128.9
Grey	125.8	124.7	51.3	68.4	137.0	2 60	86.7	75.0	57.1	11 94	89.8
Haldimand	126.9	122.6	50.4	71.0	150.0	2 40	87.3	82.6	59.2	12 14	146.3
Haliburton	130.0	130.0	66.1	77.1	152.0	2 50	90.0	78.6	60.0	15 96	112.8
Halton	125.8	123.1	55.0	72.7	140.0	2 50	88.3	76.7	60.0	15 85	124.9
Hastings	129.4	127.3	57.9	68.0	154.0	2 50	90,0	78.7	60.0	11 64	120.9
Huron	124.9	123.4	49.5	65.2	147.0	2 26	90.0	76.4	59.6	12 18	101.5
Kent	122.6	119.1	43.4	62.5	200.0	2 30	83.1	79.3	50.6	15 29	135.6
Lambton	123.3	123.3	46.1	63.0	141.0	2 40	90.0	83.8	59.0	12 44	128.3
Lanark	128.0	127.8	56.0	72.3	146.0	2 51	90.0	78.3	65.0	10 77	119.5
Leeds	130.7	128.0	55.5	75.8	143.0	2 24	90.0	80.0	59.4	12 05	139.3
Lennox and Addington	126.5	125.4	53.1	72.9	151.0	2 70	92.0	77.8	60.0	10 46	121.7
Lincoln	125.1	125.0	53.9	70.0	138.0	2 70	90.0	81.0	57.0	16 67	143.9
Manitoulin	125.4	128.8	65.0	80.0	138.0	2 50	90.0	87.0	60.0	10 40	82.1
Middlesex	125.1	124.0	45.7	64.4	125.0	2 49	86.6	75.3	52.1	13 43	118.8
Muskoka	130.0	130.0	70.0	80.0	175.0	2 50	90.0	80.0	60.0	15 30	111.5
Nipissing	130.0	130.0	65.0	80.0	152.0	2 50	90.0	85.0	55.0	14 75	119.1
Norfolk	124.1	123.3	51.9	64.9	160.0	2 40	86.2	76.7	54.6	14 68	126.3
Northumberland	123.7	122.0	54.6	70.2	152.0	2 60	87.0	73.6	60.0	11 63	123.7
Ontario	126.8	122.9	51.9	65.1	142.0	2 30	87.8	75.7	60.0	13 06	99.2
Oxford	125.2	126.0	52.0	71.0	137.0	2 50	86.2	75.2	53.8	13 57	140.6
Parry Sound	130.0	130.0	70.0	82.0	163.0	2 00	90.0	85.0	60.0	14 88	114.0
Peel	126.6	124.1	52.2	65.1	140.0	2 30	89.1	76.7	55.0	15 19	103.3
Perth	127.6	126.8	51.5	67.0	130.0	2 56	90.0	74.3	57.8	13 67	122.2
Peterborough	125.3	120.3	53.5	66.6	138.0	2 50	89.2	77.1	55.0	13 11	118.1
Prescott	130.0	130.0	54.2	73.7	183.0	2 46	90.0	86.0	65.0	9.06	108.0
Prince Edward	120.4	117.5	51.3	70.6	174.0	2 30	86.4	75.1	60.0	10 66	131.2
Rainy River & Kenora	130.0	130.0	58.3	71.2	169.0	2 25	85.0	75.0	55.0	15 50	92.2
Renfrew	123.0	124.8	51.1	68.1	163.0	2 75	82.6	73.0	65.0	10 65	118.0
Russell	130.0	130.0	54.4	73.9	167.0	2 57	90.0	84.0	65.0	9 81	120.0
Simcoe	126.1	123.0	52.1	64.4	145.0	2 50	86.8	75.6	54.0	13 82	92.0
Stormont	130.0	130.0	56.3	75.5	172.0	2 29	90.0	84.8	65.0	10 42	125.8
Sudbury	130.0	130.0	65.2	79.0	168.0	2 00	90.0	90.0	60.0	14 58	106.8
Thunder Bay	128.0	130.0	57.3	70.6	150.0	2 25	85.0	80.0	.....	18 50	110.0
Timiskaming&Cochrane	130.0	130.0	70.0	80.0	163.0	2 50	90.0	90.0	.....	14 88	136.7
Victoria	126.4	120.0	51.0	66.7	138.0	2 50	90.0	74.0	57.0	13 30	112.9
Waterloo	125.8	124.2	54.2	70.4	130.0	2 40	91.0	75.6	57.5	17 19	131.7
Welland	127.7	125.0	52.8	72.9	180.0	2 98	89.0	88.1	63.9	16 14	159.3
Wellington	125.3	122.2	50.5	66.7	134.0	2 50	88.8	77.1	55.6	15 40	98.3
Wentworth	125.8	121.3	53.8	67.2	130.0	2 70	87.0	79.8	57.3	14 94	136.0
York	128.8	125.2	54.1	68.4	141.0	2 60	89.4	78.9	59.3	15 96	103.5
The Province:											
1926	125.[illegible]	125.1	51.8	68.0	150.6	2 34	87.2	77.0	53.5	12 75	112.9
1925	133.6	133.0	45.2	68.1	135.5	2 11	87.1	73.2	55.7	11 61	136.9

HORSES ON HAND

TABLE XX.—Showing by County Municipalities the number and value of Horses on hand, *June 15th, 1926*, together with the totals for the Province for the past five years.

Counties and Districts	Stallions, 2 yrs. old and over	Mares, 2 yrs. old and over	Geldings, 2 yrs. old and over	Colts and Fillies under 2 years	Total Horses	
					Number	Value
						$
Algoma	28	1,492	1,258	173	2,951	367,305
Brant	38	4,094	3,982	456	8,570	901,414
Bruce	122	12,118	7,958	1,857	22,055	2,378,674
Carleton	121	8,300	6,391	1,406	16,218	1,830,543
Dufferin	46	5,812	4,015	950	10,823	1,119,561
Dundas	37	4,604	3,426	531	8,598	888,959
Durham	70	6,954	5,090	818	12,932	1,368,218
Elgin	62	8,028	6,507	996	15,593	1,676,320
Essex	142	9,294	6,637	1,087	17,160	1,918,168
Frontenac	40	4,801	3,685	663	9,189	894,529
Glengarry	74	4,877	2,790	718	8,459	929,031
Grenville	43	3,494	2,792	417	6,746	659,778
Grey	122	14,368	10,486	2,049	27,025	2,757,682
Haldimand	48	5,288	4,180	747	10,263	1,106,745
Haliburton	12	880	707	103	1,702	173,394
Halton	44	3,670	3,184	384	7,282	798,882
Hastings	136	8,570	7,670	967	17,343	1,876,449
Huron	95	14,617	10,032	2,502	27,246	3,039,685
Kent	104	11,558	9,354	1,759	22,775	2,588,134
Lambton	138	11,012	7,492	2,036	20,678	2,278,220
Lanark	66	5,580	4,420	709	10,775	1,116,012
Leeds	56	5,407	4,733	605	10,801	1,062,018
Lennox and Addington	52	4,914	4,352	836	10,154	993,480
Lincoln	40	3,726	3,006	312	7,084	759,792
Manitoulin	13	1,093	844	173	2,123	231,148
Middlesex	131	15,267	10,554	2,711	28,663	3,031,157
Muskoka	19	1,381	1,300	131	2,831	353,897
Nipissing	62	1,443	964	149	2,618	331,549
Norfolk	64	6,440	5,457	768	12,729	1,298,309
Northumberland	86	7,654	6,583	999	15,322	1,650,543
Ontario	94	9,510	6,959	1,146	17,709	1,965,685
Oxford	70	9,662	7,824	1,186	18,742	2,011,604
Parry Sound	45	1,848	1,662	223	3,778	479,134
Peel	46	6,149	4,615	1,016	11,826	1,305,470
Perth	72	10,885	7,856	1,773	20,586	2,209,070
Peterborough	60	5,487	4,011	610	10,168	1,139,265
Prescott	65	3,968	2,684	583	7,300	752,838
Prince Edward	24	4,170	3,482	408	8,084	844,856
Rainy River and Kenora	26	1,299	1,225	192	2,742	341,389
Renfrew	147	7,430	5,216	1,106	13,899	1,638,726
Russell	76	3,812	2,439	600	6,927	764,636
Simcoe	130	15,522	12,222	2,017	29,891	3,353,303
Stormont	38	3,608	2,829	380	6,855	670,720
Sudbury	52	1,437	966	134	2,589	344,827
Thunder Bay	41	851	950	66	1,908	239,874
Timiskaming & Cochrane	45	1,526	1,395	100	3,066	459,381
Victoria	60	6,532	5,085	883	12,560	1,338,819
Waterloo	64	6,585	5,465	941	13,055	1,305,886
Welland	41	3,986	3,446	430	7,903	884,224
Wellington	82	11,744	8,774	1,600	22,200	2,366,652
Wentworth	43	5,442	4,265	561	10,311	1,082,299
York	83	10,735	8,739	1,295	20,852	2,361,502
The Province:						
1926	3,515	328,924	251,958	45,262	629,659	68,239,756
1925	3,512	335,469	259,247	45,910	644,138	69,787,791
1924	3,671	344,370	266,560	49,274	663,875	72,617,565
1923	3,562	348,266	268,381	53,162	673,371	74,542,351
1922	3,569	350,998	272,442	58,843	685,852	74,535,855

CATTLE AND

TABLE XXI.—Showing by County Municipalities the number and value of Cattle

Counties and Districts	Bulls for breeding	Cows for milk purposes	Cows for beef purposes	Yearlings for milk purposes	Yearlings for beef purposes	Calves	All other Cattle
Algoma	335	6,139	351	1,526	1,692	3,298	842
Brant	725	16,196	632	4,309	2,999	5,990	947
Bruce	1,502	35,518	3,452	5,919	20,580	26,225	18,975
Carleton	2,375	46,119	2,456	9,651	4,948	15,755	4,347
Dufferin	712	16,056	1,707	2,667	8,627	11,419	5,926
Dundas	1,906	33,242	354	5,735	116	6,406	681
Durham	840	19,078	2,132	4,000	7,287	11,156	4,250
Elgin	1,612	33,507	1,146	6,900	4,778	11,681	4,744
Essex	932	21,618	1,709	4,504	1,700	5,991	1,264
Frontenac	1,935	31,744	1,300	5,722	2,026	10,850	972
Glengarry	2,148	32,914	725	6,348	374	7,176	656
Grenville	1,329	21,852	498	4,620	201	5,088	607
Grey	1,847	44,407	4,095	6,480	23,750	31,299	17,960
Haldimand	703	16,994	686	3,993	3,607	7,563	1,352
Haliburton	242	3,926	238	687	1,405	2,768	691
Halton	762	14,115	1,044	3,206	3,642	6,458	1,985
Hastings	3,186	47,070	1,692	9,949	2,445	17,303	2,259
Huron	1,741	41,881	4,018	7,248	22,332	28,690	17,937
Kent	905	23,043	3,151	4,492	7,180	11,620	7,704
Lambton	1,188	33,435	2,997	5,290	15,673	21,912	13,354
Lanark	1,616	28,467	2,794	6,996	7,992	15,926	5,934
Leeds	2,342	40,666	787	8,057	959	10,179	1,338
Lennox&Addington	1,534	27,214	805	4,667	2,238	9,397	1,354
Lincoln	401	10,965	481	2,090	911	3,386	378
Manitoulin	200	3,962	258	682	2,168	2,871	1,378
Middlesex	2,515	55,366	3,552	11,163	15,633	26,630	17,217
Muskoka	347	7,252	319	1,578	1,554	3,754	967
Nipissing	865	7,460	487	1,972	1,257	4,321	807
Norfolk	980	22,547	496	4,942	846	6,388	730
Northumberland	1,685	28,892	1,764	6,706	4,696	12,439	3,010
Ontario	1,320	27,485	2,910	6,217	11,462	17,004	7,685
Oxford	2,568	48,555	1,763	10,877	3,877	14,152	4,075
Parry Sound	411	8,544	540	1,900	2,925	5,675	1,917
Peel	966	19,777	1,506	5,416	4,168	7,580	2,974
Perth	1,796	37,946	2,404	8,714	11,984	21,071	7,663
Peterborough	1,110	23,096	1,130	5,326	4,844	11,474	3,002
Prescott	2,008	29,957	664	6,228	433	7,552	812
Prince Edward	1,037	17,389	589	3,317	612	4,621	233
Rainy R. & Kenora	246	4,373	217	1,284	985	2,430	526
Renfrew	2,677	31,757	3,812	7,116	8,996	19,353	6,337
Russell	1,722	25,835	671	5,976	909	7,465	825
Simcoe	2,035	45,570	4,296	9,447	18,696	27,228	12,480
Stormont	1,735	29,986	501	4,656	194	5,178	667
Sudbury	732	6,705	481	1,698	856	3,607	461
Thunder Bay	196	4,575	90	942	106	1,519	72
Timis'g & Cochrane	478	5,429	325	1,684	1,090	3,425	310
Victoria	845	21,565	1,722	4,265	9,677	13,792	9,714
Waterloo	1,001	20,492	783	4,678	5,362	10,662	1,684
Welland	583	12,899	510	2,662	1,109	3,760	688
Wellington	1,380	30,836	3,689	5,426	16,834	21,177	8,673
Wentworth	820	18,184	577	4,297	2,214	5,742	1,077
York	1,778	37,836	1,718	8,710	3,847	11,239	3,668
The Province:							
1926	66,854	*1,280,436	77,024	262,935	284,796	569,645	216,109
1925	68,515	*1,232,679	89,014	264,104	292,210	575,466	287,385
1924	70,838	*1,203,527	100,982	271,755	306,463	592,408	371,329
1923	69,308	‡1,265,965	....	....	....	626,553	†876,261
1922	69,077	‡1,235,665	....	....	....	626,353	†905,086

‡Milch cows. †Including yearlings. *Including dual purpose cows.

SHEEP ON HAND

on hand, June 15th, 1926, together with the totals for the Province for the past five years.

Total Cattle		Sheep and Lambs					Counties and Districts
Number	Value	Ewes for breeding	1 year and over	Under 1 year	Total Sheep and Lambs Number	Total Sheep and Lambs Value	
	$					$	
14,183	530,200	3,852	380	4,008	8,240	74,796	Algoma
31,798	1,450,606	4,682	535	5,112	10,329	113,898	Brant
112,171	4,588,681	19,241	1,797	20,046	41,084	450,468	Bruce
85,651	3,599,227	9,605	1,343	9,543	20,491	232,685	Carleton
47,114	1,774,894	12,942	1,518	13,410	27,870	319,241	Dufferin
48,440	2,400,300	815	77	949	1,841	18,119	Dundas
48,743	1,995,414	10,632	1,803	11,175	23,610	279,235	Durham
64,368	3,053,285	10,187	1,032	9,980	21,199	239,287	Elgin
37,718	1,843,187	8,309	714	8,860	17,883	181,791	Essex
54,549	1,929,143	7,054	720	7,509	15,283	154,777	Frontenac
50,341	2,291,376	2,356	677	2,570	5,603	54,713	Glengarry
34,195	1,466,526	3,922	299	4,395	8,616	89,380	Grenville
129,838	4,970,868	28,890	3,308	31,658	63,856	720,766	Grey
34,898	1,592,855	6,077	856	6,887	13,820	149,152	Haldimand
9,957	280,973	2,862	372	2,692	5,926	51,260	Haliburton
31,212	1,424,530	5,127	580	5,357	11,064	135,664	Halton
83,904	2,942,759	14,171	1,578	13,858	29,607	293,080	Hastings
123,847	5,168,433	10,462	1,345	11,752	23,559	280,952	Huron
58,095	2,508,562	8,089	1,007	8,221	17,317	188,648	Kent
93,849	4,153,733	12,528	1,364	13,539	27,431	322,306	Lambton
69,725	2,342,339	17,141	1,365	16,740	35,246	393,396	Lanark
64,328	2,603,972	5,530	531	5,592	11,653	130,190	Leeds
47,209	1,895,929	5,183	714	5,283	11,180	117,157	Lennox and Addington
18,612	979,881	3,166	549	3,492	7,207	84,585	Lincoln
11,519	376,826	6,793	772	7,240	14,805	139,203	Manitoulin
132,076	6,003,916	9,875	2,282	10,693	22,850	279,439	Middlesex
15,771	545,533	3,664	476	3,598	7,738	72,045	Muskoka
17,169	550,023	4,387	522	4,350	9,259	80,358	Nipissing
36,929	1,733,232	4,111	488	4,368	8,967	89,445	Norfolk
59,192	2,493,857	6,711	1,102	7,295	15,108	166,100	Northumberland
74,083	3,124,424	14,028	2,694	14,625	31,347	394,411	Ontario
85,867	4,439,977	3,426	636	3,886	7,948	92,384	Oxford
21,912	733,195	8,200	849	7,952	17,001	158,402	Parry Sound
42,387	2,059,401	5,289	532	5,569	11,390	135,783	Peel
91,578	3,777,035	3,716	634	4,288	8,638	96,640	Perth
49,982	1,800,905	6,028	890	6,242	13,160	139,564	Peterborough
47,654	1,896,710	1,907	686	2,686	5,279	45,092	Prescott
27,798	1,303,863	4,440	410	4,487	9,337	99,408	Prince Edward
10,061	324,862	1,512	186	1,593	3,291	32,538	Rainy River & Kenora
80,048	2,364,658	26,932	4,074	27,145	58,151	546,795	Renfrew
43,403	1,780,892	2,084	694	2,490	5,268	52,922	Russell
119,752	4,709,403	25,945	2,703	26,534	55,182	594,572	Simcoe
42,917	1,935,214	1,057	264	1,255	2,576	25,143	Stormont
14,540	485,827	1,372	502	2,019	3,893	32,507	Sudbury
7,500	333,901	514	15	400	929	8,759	Thunder Bay
12,741	543,312	2,371	326	2,351	5,048	54,593	Timiska'g & Cochrane
61,580	2,191,456	12,020	1,744	11,776	25,540	283,926	Victoria
44,662	1,975,351	2,345	412	2,640	5,397	59,308	Waterloo
22,211	1,085,012	3,410	264	3,545	7,219	73,727	Welland
88,015	3,793,829	14,875	1,898	16,619	33,392	414,026	Wellington
32,911	1,668,851	3,842	385	4,102	8,329	96,095	Wentworth
68,796	3,567,076	14,400	1,146	13,980	29,526	349,954	York
							The Province:
2,757,799	115,386,214	408,077	52,050	426,356	886,483	9,688,685	1926
2,809,373	115,844,069	406,894	43,653	417,979	868,526	9,576,722	1925
2,917,302	113,046,599	440,380		429,899	870,279	7,081,500	1924
2,838,087	109,467,066	464,549		443,124	907,673	6,597,087	1923
2,836,181	103,899,416	501,319		485,298	986,617	6,612,959	1922

SWINE ON HAND

TABLE XXII.—*Showing by County Municipalities the number and value of Swine on hand, June 15th, 1926, together with the totals for the Province for the past five years.*

Counties and Districts	*Brood* Sows	Other Swine: Six mos. and over	Other Swine: Under 6 mos.	Total Swine: Number	Total Swine: Value
					$
Algoma	564	404	3,050	4,018	47,743
Brant	2,361	2,751	14,617	19,729	299,002
Bruce	*6,400*	*9,074*	*40,405*	*55,879*	*857,481*
Carleton	4,116	2,156	26,662	32,934	408,719
Dufferin	3,620	5,934	25,948	35,502	509,533
Dundas	2,431	3,389	15,414	21,234	296,390
Durham	3,320	4,303	21,087	28,710	410,961
Elgin	*5,422*	*8,473*	*35,020*	*48,915*	*669,492*
Essex	10,988	19,800	64,238	95,026	1,272,482
Frontenac	2,445	2,542	14,482	19,469	245,168
Glengarry	2,404	2,665	15,339	20,408	267,775
Grenville	1,596	1,618	10,386	13,600	188,506
Grey	*8,762*	*12,049*	*55,994*	*76,805*	*1,151,747*
Haldimand	2,731	3,016	17,942	23,689	339,089
Haliburton	*300*	*323*	*1,366*	*1,989*	*24,311*
Halton	2,026	3,112	13,501	18,639	293,544
Hastings	5,976	5,548	39,584	51,108	671,084
Huron	*8,646*	*12,344*	*54,417*	*75,407*	*1,139,733*
Kent	12,066	21,473	74,538	108,077	1,416,238
Lambton	*7,129*	*12,383*	*47,376*	*66,888*	*954,688*
Lanark	2,570	2,113	17,566	22,249	281,683
Leeds	2,697	2,464	17,218	22,379	288,888
Lennox and Addington	2,695	2,118	17,175	21,988	298,533
Lincoln	1,503	1,400	9,360	12,263	181,129
Manitoulin	*483*	*404*	*2,864*	*3,751*	*37,407*
Middlesex	7,337	8,753	49,134	65,224	961,867
Muskoka	408	454	2,062	2,924	41,515
Nipissing	903	659	5,091	6,653	74,961
Norfolk	3,556	4,531	20,766	28,853	406,207
Northumberland	*4,479*	*2,835*	*30,834*	*38,148*	*515,320*
Ontario	5,937	9,794	37,627	53,358	804,813
Oxford	*6,228*	*9,275*	*40,328*	*55,831*	*798,110*
Parry Sound	650	532	4,374	5,556	61,305
Peel	2,603	3,332	18,367	24,302	376,896
Perth	8,057	11,518	53,377	72,952	1,088,765
Peterborough	2,608	2,342	16,565	21,515	294,626
Prescott	*2,237*	*2,325*	*14,838*	*19,400*	*255,440*
Prince Edward	2,383	1,405	14,578	18,366	254,353
Rainy River and Kenora	447	484	2,222	3,153	42,247
Renfrew	3,675	3,079	20,497	27,251	319,754
Russell	2,216	1,847	14,447	18,510	224,437
Simcoe	*9,672*	*13,083*	*64,473*	*87,228*	*1,258,716*
Stormont	2,497	2,712	16,117	21,326	276,764
Sudbury	846	530	4,067	5,443	68,469
Thunder Bay	310	287	1,627	2,224	29,963
Timiskaming & Cochrane	860	741	4,032	5,633	76,748
Victoria	3,422	4,621	21,830	29,873	437,344
Waterloo	5,172	9,547	31,645	46,364	699,246
Welland	1,703	2,019	9,263	12,985	190,935
Wellington	8,223	12,260	54,367	74,850	1,127,468
Wentworth	2,888	3,298	18,797	24,983	369,256
York	7,069	10,520	44,205	61,794	918,275
The Province:					
1926	*199,637*	*264,639*	*1,271,079*	*1,735,355*	*24,525,126*
1925	190,210	323,449	1,164,936	1,678,595	24,424,238
1924	199,860	1,608,043		1,807,903	16,201,699
1923	178,375	1,821,089		1,734,734	19,018,668
1922	172,947	1,755,390		1,553,434	16,550,636

POULTRY ON HAND

TABLE XXIII.—Showing by County Municipalities the number and value of Poultry on hand, June 15th, 1926, together with the totals for the Province for the past five years.

Counties and Districts	Turkeys	Geese	Ducks	Other Fowls	Total Poultry	
					Number	Value
						$
Algoma	3,643	1,235	875	65,523	71,276	53,863
Brant	1,608	7,280	5,753	200,000	214,641	146,446
Bruce	20,548	21,447	19,096	515,357	576,448	412,690
Carleton	13,640	19,413	13,823	377,278	424,154	332,208
Dufferin	2,471	18,042	7,246	203,488	231,247	171,005
Dundas	9,520	9,180	7,334	259,257	285,291	204,406
Durham	3,645	13,969	12,185	336,612	366,411	257,435
Elgin	15,010	14,106	14,329	457,388	500,833	359,923
Essex	14,354	22,786	33,383	761,465	831,988	584,293
Frontenac	28,542	4,124	6,773	171,471	210,910	163,310
Glengarry	16,320	2,475	3,451	188,904	211,150	158,642
Grenville	9,764	5,707	6,734	182,033	204,238	148,623
Grey	14,917	30,970	23,223	579,942	649,052	450,745
Haldimand	12,070	7,135	8,579	320,529	348,313	241,658
Haliburton	2,273	722	161	26,176	29,332	21,273
Halton	2,656	9,881	5,881	176,224	194,642	147,074
Hastings	12,937	10,590	8,610	388,121	420,258	284,816
Huron	9,271	26,454	28,718	820,519	884,962	587,472
Kent	13,114	19,639	36,327	761,398	830,478	546,412
Lambton	38,200	27,250	29,564	742,430	837,444	575,412
Lanark	10,694	4,827	4,434	246,465	266,420	195,131
Leeds	21,179	4,935	7,778	229,840	263,732	192,699
Lennox and Addington	9,790	4,655	6,223	257,126	277,794	191,564
Lincoln	5,459	5,033	5,734	213,796	230,022	159,456
Manitoulin	8,659	1,737	906	37,249	48,551	39,637
Middlesex	33,356	30,418	34,771	894,545	993,090	695,994
Muskoka	1,372	1,001	1,038	62,426	65,837	45,963
Nipissing	572	1,105	632	52,107	54,416	36,962
Norfolk	8,398	5,639	9,368	386,769	410,174	268,815
Northumberland	7,470	9,274	11,205	368,591	396,540	272,466
Ontario	6,666	19,453	17,270	402,186	445,575	333,877
Oxford	1,794	13,869	15,290	545,272	576,225	380,937
Parry Sound	2,394	2,955	1,211	63,675	70,235	53,255
Peel	5,292	13,462	11,993	251,830	282,577	213,043
Perth	1,739	19,932	21,702	552,788	596,161	382,281
Peterborough	12,829	7,676	4,924	223,323	248,752	172,784
Prescott	11,473	4,402	4,805	184,587	205,267	147,890
Prince Edward	7,633	2,831	5,903	183,409	199,776	140,169
Rainy River and Kenora	5,134	1,348	430	62,117	69,029	47,380
Renfrew	11,582	10,338	3,909	264,443	290,272	207,335
Russell	1,309	6,712	6,817	150,412	165,250	114,439
Simcoe	15,696	31,546	20,202	594,568	662,012	484,633
Stormont	8,485	4,339	5,944	211,849	230,617	161,394
Sudbury	1,356	948	191	50,810	53,305	37,966
Thunder Bay	994	738	1,005	52,698	55,435	35,932
Timiskaming & Cochrane	2,473	2,021	1,276	56,696	62,466	49,011
Victoria	7,627	14,892	8,089	266,518	297,126	205,192
Waterloo	440	7,397	7,844	313,222	328,903	206,060
Welland	2,536	4,120	7,861	246,576	261,093	189,960
Wellington	1,984	27,785	14,801	441,690	486,260	337,416
Wentworth	2,576	5,625	7,180	232,309	247,690	170,075
York	6,517	23,733	21,349	477,731	529,330	383,563
The Province:						
1926	469,981	567,151	544,130	16,111,738	17,693,000	12,400,985
1925	480,612	555,720	558,742	16,183,507	17,778,581	13,527,454
1924	484,575	520,390	559,199	15,187,181	16,751,345	13,446,621
1923	364,425	467,749	449,486	13,921,724	15,203,384	12,401,083
1922	336,447	446,487	440,539	12,740,844	13,964,317	12,241,252

FARM PROPERTY, IMPLEMENTS AND LIVE STOCK

TABLE XXIV.—Showing by County Municipalities of Ontario the value of farm lands, buildings, implements and live stock for 1926, together with the totals for the Province for 1925.

Counties and Districts	Land	Buildings	Implements	Live Stock on hand	Total
	$	$	$	$	$
Algoma	4,735,888	1,913,521	812,676	1,073,907	8,535,992
Brant	10,991,444	7,308,798	2,284,761	2,911,366	23,496,369
Bruce	30,041,053	16,871,094	5,015,792	8,687,994	60,615,933
Carleton	26,719,545	12,844,333	4,462,554	6,403,382	50,429,814
Dufferin	12,689,777	8,631,147	2,534,636	3,894,234	27,749,794
Dundas	11,312,867	6,751,068	2,771,711	3,808,174	24,643,820
Durham	13,570,832	8,847,528	2,925,012	4,311,263	29,654,635
Elgin	23,065,528	13,164,424	4,262,497	5,998,307	46,490,756
Essex	33,381,947	17,598,396	5,576,879	5,799,921	62,357,143
Frontenac	10,198,703	5,104,067	2,023,513	3,386,927	20,713,210
Glengarry	12,253,471	6,486,028	2,426,645	3,701,537	24,867,681
Grenville	7,179,799	4,589,389	1,777,530	2,552,813	16,099,531
Grey	33,403,580	21,507,582	6,248,607	10,051,808	71,211,577
Haldimand	12,774,685	8,171,236	2,730,364	3,429,499	27,105,784
Haliburton	1,745,858	696,465	359,858	551,211	3,353,392
Halton	12,610,597	8,064,025	2,373,875	2,799,694	25,848,191
Hastings	18,843,794	10,163,503	3,989,400	6,068,188	39,064,885
Huron	33,675,744	21,060,709	6,781,037	10,216,275	71,733,765
Kent	45,311,670	19,965,540	6,973,856	7,247,994	79,499,060
Lambton	33,892,790	16,329,185	5,643,556	8,284,359	64,149,890
Lanark	11,494,135	5,807,192	2,427,170	4,328,561	24,057,058
Leeds	12,954,262	6,958,285	2,557,917	4,277,767	26,748,231
Lennox and Addington	10,506,191	6,152,563	2,365,527	3,496,663	22,520,944
Lincoln	15,100,690	7,955,532	2,390,074	2,164,843	27,611,139
Manitoulin	2,791,691	991,037	464,482	824,221	5,071,431
Middlesex	43,072,913	24,881,398	7,693,951	10,972,373	86,620,635
Muskoka	3,838,382	1,743,761	775,585	1,058,953	7,416,681
Nipissing	4,116,770	1,698,524	891,545	1,073,853	7,780,692
Norfolk	15,391,931	8,843,962	3,151,486	3,796,008	31,183,387
Northumberland	15,310,842	9,870,313	3,430,871	5,098,286	33,710,312
Ontario	21,286,273	13,383,640	4,109,837	6,623,210	45,402,960
Oxford	25,843,743	17,043,121	5,465,632	7,723,012	56,075,508
Parry Sound	4,329,960	2,086,044	934,754	1,485,291	8,836,049
Peel	17,592,745	10,496,996	3,045,784	4,090,593	35,226,118
Perth	24,798,946	18,958,117	5,619,313	7,553,791	56,930,167
Peterborough	13,787,531	7,066,112	2,392,474	3,547,144	26,793,261
Prescott	14,276,441	6,374,195	2,315,019	3,097,970	26,063,625
Prince Edward	8,475,452	5,631,049	2,300,102	2,642,649	19,049,252
Rainy River and Kenora	4,610,027	1,475,533	714,090	788,416	7,588,066
Renfrew	19,075,094	8,399,471	3,742,222	5,077,268	36,294,055
Russell	11,895,241	5,544,537	1,958,713	2,937,326	22,335,817
Simcoe	36,710,082	22,151,698	6,883,688	10,400,627	76,146,095
Stormont	9,388,944	5,760,144	2,304,284	3,069,217	20,522,589
Sudbury	4,678,206	1,609,051	919,303	969,596	8,176,156
Thunder Bay	4,274,448	1,530,657	687,180	648,429	7,140,714
Timiskaming & Cochrane	7,617,924	1,974,498	1,175,499	1,183,045	11,950,966
Victoria	15,384,857	7,659,407	2,856,835	4,456,737	30,357,836
Waterloo	16,014,755	11,551,448	3,120,575	4,245,869	34,932,647
Welland	12,087,012	7,442,407	2,430,957	2,423,858	24,384,234
Wellington	25,145,032	18,654,666	4,990,691	8,039,391	56,829,780
Wentworth	16,144,499	9,142,895	3,046,699	3,386,576	31,720,669
York	34,783,046	18,644,853	5,341,467	7,580,370	66,349,736
The Province:					
1926	871,177,637	493,551,144	164,478,485	230,240,766	1,759,448,032
1925	879,212,498	490,027,751	164,188,030	233,160,274	1,766,588,553

APPENDIX

Comparative Farm Statistics for Forty-five Years—1882 to 1926

STATISTICS OF FARM CROPS

Fall Wheat and Spring Wheat

The following table gives the area, produce and market value of fall wheat and spring wheat for the years 1882 to 1926, together with the annual average for the various periods of ten years, and the average for the forty-five years.

Years	Fall Wheat				Spring Wheat			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market Value
				$				$
1926	807,015	20,988,030	26.0	26,262,506	115,497	2,166,054	18.8	2,708,690
1925	747,101	22,764,736	30.5	30,420,639	113,338	2,440,632	21.5	3,245,576
1924	722,366	21,396,621	29.6	28,646,679	101,401	1,948,853	19.2	2,669,773
1923	717,307	16,599,067	23.1	15,976,322	111,601	1,937,937	17.4	1,865,540
1922	813,935	17,792,958	21.9	18,616,746	124,206	2,099,503	16.9	2,207,565
1921	621,420	13,667,879	22.0	15,096,980	152,904	1,907,459	12.5	2,087,264
1920	762,371	18,492,013	24.3	35,759,610	267,367	4,480,472	16.8	8,237,182
1919	619,494	15,051,703	24.3	35,698,096	361,150	5,646,544	15.6	13,603,841
1918	362,616	7,054,845	19.5	14,877,794	351,423	8,186,191	23.3	17,076,203
1917	585,946	13,384,207	22.8	28,078,738	182,957	3,679,516	20.1	7,716,693
1916	704,867	14,942,050	21.2	24,099,591	144,305	2,213,961	15.3	3,591,681
1915	811,185	24,737,011	30.5	24,023,286	162,142	3,439,949	21.2	3,392,996
1914	685,692	14,333,548	20.9	15,641,232	118,607	2,169,425	18.3	2,340,520
1913	646,533	15,945,717	24.7	13,550,459	116,581	2,068,951	17.7	1,818,652
1912	759,888	15,039,885	19.8	13,795,968	123,080	2,302,339	18.7	2,072,266
1911	837,492	17,926,586	21.4	15,519,411	133,711	2,295,534	17.2	2,081,580
1910	743,473	19,837,172	26.7	17,172,678	129,319	2,489,833	19.3	2,229,999
1909	663,375	15,967,653	24.1	16,335,950	135,161	2,223,567	16.5	2,237,189
1908	679,642	16,430,476	24.2	14,649,061	142,124	2,197,716	15.5	1,996,230
1907	676,164	15,545,491	23.0	14,410,670	144,514	2,473,651	17.1	2,137,234
1906	787,287	18,841,774	23.9	13,321,134	171,745	3,267,000	19.0	2,250,963
1905	796,213	17,933,961	22.5	13,719,480	190,116	3,582,627	18.8	2,683,387
1904	605,458	9,160,623	15.1	9,041,535	225,027	3,471,103	15.4	3,269,779
1903	665,028	17,242,763	25.9	12,949,315	248,518	4,650,707	18.7	3,460,126
1902	748,592	20,233,669	27.0	14,305,204	303,115	6,048,024	20.0	4,209,425
1901	911,587	15,943,229	17.5	10,538,474	358,048	5,498,751	15.4	3,673,166
1900	1,068,640	23,369,737	21.9	15,517,505	376,905	6,940,333	18.4	4,684,725
1899	1,049,691	14,439,827	13.8	9,631,365	398,726	7,041,317	17.7	4,682,476
1898	1,048,182	25,158,713	24.0	17,460,147	389,205	6,873,785	17.7	4,756,659
1897	950,222	23,988,051	25.2	18,758,656	323,305	4,868,101	15.1	3,826,327
1896	876,955	15,078,441	17.2	10,705,693	255,361	3,519,322	13.8	2,484,641
1895	743,199	14,155,282	19.0	9,809,610	223,957	3,472,543	15.5	2,423,835
1894	778,992	16,512,106	21.2	9,081,658	230,016	3,367,854	14.6	1,869,159
1893	913,954	17,545,248	19.2	10,509,604	356,721	4,186,063	11.7	2,486,521
1892	966,522	20,492,497	21.2	14,488,195	651,302	8,290,395	12.7	5,620,888
1891	849,956	21,872,488	25.7	20,800,736	510,634	10,711,538	21.0	9,951,019
1890	720,101	14,267,383	19.8	13,439,875	601,753	7,683,905	12.8	7,015,405
1889	822,115	13,001,865	15.8	11,493,648	398,610	5,697,707	14.3	5,019,680
1888	826,537	13,830,787	16.7	14,162,726	367,850	6,453,559	17.5	6,408,384
1887	897,743	14,440,611	16.1	11,321,439	484,821	5,633,117	11.6	4,393,831
1886	886,402	18,071,142	20.4	13,300,361	577,465	9,518,553	16.5	6,900,951
1885	875,136	21,478,281	24.5	17,504,799	799,463	9,129,881	11.4	7,358,684
1884	864,740	20,717,631	24.0	16,677,693	721,647	14,609,661	20.2	11,892,264
1883	1,097,210	11,656,957	10.6	12,239,805	586,410	9,726,063	16.6	10,406,887
1882	1,188,520	31,255,202	26.3	31,567,754	586,817	9,665,999	16.5	10,245,959
Annual Averages:								
1922–1926	761,545	19,908,282	26.1	23,984,578	113,209	2,118,596	18.7	2,539,429
1912–1921	656,001	15,264,886	23.3	22,062,175	198,052	3,609,481	18.2	6,193,730
1902–1911	720,272	16,912,017	23.5	14,142,444	182,335	3,269,976	17.9	2,655,591
1892–1901	930,794	18,668,313	20.1	12,650,091	356,355	5,405,846	15.2	3,650,840
1882–1891	902,846	18,059,235	20.0	16,250,884	563,547	8,882,998	15.8	7,959,306
1882–1926	797,930	17,524,131	22.0	17,132,863	301,532	4,939,467	16.4	4,828,707

STATISTICS OF FARM CROPS

Oats and Barley

The following table gives the area, produce and market value of Oats and Barley for the years 1882 to 1926, together with the annual averages for the various periods of ten years and the average for the forty-five years.

Years	Oats				Barley			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
1926	2,831,755	95,722,130	33.8	49,615,846	449,095	14,447,174	32.2	9,823,171
1925	2,837,390	118,100,471	41.6	53,404,626	436,383	14,917,247	34.2	10,160,463
1924	2,891,990	114,249,129	39.5	61,899,999	439,177	14,570,403	33.2	11,970,808
1923	2,967,417	103,485,442	34.9	46,937,124	452,490	13,523,349	29.9	8,487,609
1922	3,034,090	116,033,569	38.2	50,450,114	433,922	13,971,811	32.2	8,561,782
1921	3,094,958	72,575,191	23.4	36,555,194	462,176	10,149,353	22.0	6,665,865
1920	2,880,053	129,171,312	44.9	75,159,913	484,328	16,660,350	34.4	15,631,613
1919	2,674,341	78,388,018	29.3	76,572,899	569,183	13,133,757	23.1	19,146,902
1918	2,924,468	131,752,601	45.1	98,798,745	660,404	24,247,673	36.7	25,112,912
1917	2,763,355	111,232,817	40.3	86,640,057	551,298	18,387,741	33.4	23,118,166
1916	2,689,762	71,297,528	26.5	47,066,428	527,886	12,388,969	23.5	12,621,940
1915	2,871,755	120,217,952	41.9	47,452,121	552,318	19,893,129	36.0	11,130,811
1914	2,776,883	103,564,322	37.3	51,232,043	579,473	18,096,754	31.2	11,640,790
1913	2,699,459	98,426,902	36.5	36,342,489	623,658	18,255,958	29.3	10,136,759
1912	2,601,735	98,444,807	37.8	38,005,016	647,382	19,232,275	29.7	11,296,962
1911	2,699,230	84,829,232	31.4	37,494,695	616,977	16,248,129	26.3	12,000,154
1910	2,757,933	102,084,924	37.0	35,698,964	626,144	19,103,107	30.5	9,930,410
1909	2,695,585	90,235,579	33.5	35,612,676	695,262	18,776,777	27.0	10,286,328
1908	2,774,259	96,626,419	34.8	38,987,985	734,029	20,888,569	28.5	10,943,788
1907	2,932,509	83,524,301	28.5	40,759,859	766,891	21,718,332	28.3	12,900,689
1906	2,716,711	108,341,455	39.9	36,836,095	756,163	25,253,011	33.4	11,363,855
1905	2,668,416	105,563,572	39.6	35,469,360	772,633	24,265,394	31.4	10,409,854
1904	2,654,936	102,173,443	38.5	33,002,022	772,434	24,567,825	31.8	10,736,140
1903	2,638,665	109,874,053	41.6	32,193,097	709,839	24,378,817	34.3	10,263,482
1902	2,500,758	106,431,439	42.6	37,038,141	661,622	21,890,602	33.1	9,872,661
1901	2,408,264	78,334,490	32.5	28,357,085	637,201	16,761,076	26.3	7,542,484
1900	2,398,834	89,693,327	37.4	23,768,732	577,810	16,909,751	29.3	6,577,893
1899	2,363,778	89,897,724	38.0	24,901,670	490,374	14,830,891	30.2	5,858,202
1898	2,376,360	86,858,293	36.6	22,409,440	438,784	12,663,668	28.9	4,812,194
1897	2,432,491	86,318,128	35.5	19,507,897	451,515	12,021,779	26.6	3,245,880
1896	2,425,107	82,979,992	34.2	16,595,998	462,792	12,669,744	27.4	4,003,639
1895	2,373,309	84,697,566	35.7	24,646,992	478,046	12,090,507	25.3	4,884,565
1894	2,342,766	70,172,516	30.0	21,613,135	486,261	10,980,404	22.6	1,447,064
1893	1,936,644	58,584,529	30.3	19,450,064	467,315	9,806,088	21.0	3,932,241
1892	1,861,469	64,758,053	34.8	19,945,480	499,225	12,274,318	24.6	5,069,293
1891	1,840,636	75,009,542	40.8	27,378,483	553,166	16,141,904	29.2	7,925,675
1890	1,882,366	52,768,207	28.0	21,687,734	701,326	15,600,169	22.2	7,831,285
1889	1,923,444	64,346,301	33.5	19,625,622	875,286	23,386,388	26.7	10,290,011
1888	1,849,868	65,466,911	35.4	26,514,099	895,432	23,366,569	26.1	14,043,308
1887	1,682,463	49,848,101	29.6	17,247,443	767,346	17,134,830	22.3	9,715,448
1886	1,621,901	58,665,608	36.2	18,772,995	735,778	19,512,278	26.5	10,009,799
1885	1,543,745	55,229,742	35.8	17,397,369	597,873	16,533,587	27.7	9,126,540
1884	1,481,828	57,696,304	38.9	19,097,476	700,472	19,119,041	27.3	10,247,806
1883	1,418,309	54,573,609	38.5	20,737,971	757,156	18,414,337	24.3	10,496,172
1882	1,387,487	50,501,701	36.4	21,715,731	848,617	24,284,407	28.6	15,784,865
Annual Averages:								
1922–1926	2,912,528	109,518,148	37.6	52,461,542	442,213	14,285,997	32.3	9,800,767
1912–1921	2,797,677	101,507,145	36.3	59,382,491	565,811	17,044,596	30.1	14,650,272
1902–1911	2,703,900	98,968,442	36.6	36,309,289	711,199	21,709,056	30.5	10,870,736
1892–1901	2,291,902	79,229,462	34.6	22,119,649	498,932	13,100,823	26.3	5,037,346
1882–1891	1,663,205	58,410,603	35.1	21,017,492	743,245	19,349,351	26.0	10,547,091
1882–1926	2,425,100	87,305,494	36.0	36,679,932	608,954	17,410,405	28.6	10,223,517

STATISTICS OF FARM CROPS

Peas and Beans

The following table gives the area, produce and market value of Peas and Beans for the years 1882 to 1926, together with the annual average for the various periods of ten years, and the average for the forty-five years.

Years	Peas				Beans			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
1926	97,865	1,880,301	19.2	2,831,588	51,721	819,166	15.8	1,913,221
1925	133,434	2,607,287	19.5	3,532,258	61,080	1,154,317	18.9	2,431,446
1924	130,989	2,456,164	18.8	3,712,042	52,047	856,860	16.5	1,958,602
1923	117,409	2,030,850	17.3	2,940,685	41,127	633,713	15.4	1,538,701
1922	105,544	2,076,965	19.7	2,914,720	39,999	622,781	15.6	1,579,549
1921	105,964	1,441,095	13.6	2,205,423	26,509	427,531	16.1	1,005,057
1920	109,187	2,209,523	20.2	4,270,938	22,744	380,499	16.7	1,097,137
1919	127,253	1,816,517	14.3	4,794,268	22,920	288,480	12.6	1,154,081
1918	113,862	2,381,937	20.9	5,184,332	100,082	1,387,834	13.9	6,230,007
1917	90,322	1,512,567	16.7	4,855,888	110,680	1,078,510	9.7	7,446,626
1916	95,542	1,243,979	13.4	2,618,754	53,999	583,105	10.8	3,183,086
1915	126,943	2,043,049	16.1	3,302,641	62,863	882,819	14.0	2,745,105
1914	177,856	2,609,585	14.7	3,565,974	51,149	835,895	16.3	1,787,432
1913	177,303	3,108,263	17.5	3,127,551	66,639	1,021,243	15.3	1,738,900
1912	221,524	3,667,005	16.6	4,047,354	69,703	1,182,132	17.0	2,280,173
1911	304,491	4,462,182	14.7	4,380,883	51,508	898,212	17.4	1,711,089
1910	403,414	6,016,003	14.9	4,856,986	49,778	892,927	17.9	1,386,798
1909	381,609	7,613,656	20.0	6,437,685	45,029	826,344	18.4	1,334,325
1908	396,642	7,401,336	18.7	6,121,449	46,477	783,757	16.9	1,160,103
1907	340,977	7,365,036	21.6	5,744,728	47,562	790,269	16.6	1,201,209
1906	410,356	7,388,987	18.0	5,216,625	51,272	950,312	18.5	1,320,934
1905	374,518	7,100,021	19.0	4,636,314	50,543	846,443	16.7	1,117,305
1904	339,260	6,629,866	19.5	4,176,816	50,892	912,849	17.9	1,113,676
1903	407,133	8,924,650	21.9	5,738,550	53,039	978,246	18.4	1,379,327
1902	532,639	7,664,679	14.4	5,441,922	53,964	670,633	12.4	905,355
1901	602,724	10,089,173	16.7	6,588,230	53,688	824,122	15.4	1,030,153
1900	661,592	14,058,198	21.2	8,027,231	44,053	820,373	18.6	817,912
1899	743,139	15,140,790	20.4	8,675,673	40,485	651,009	16.1	703,090
1898	865,951	13,521,263	15.6	7,058,099	45,220	759,657	16.8	531,760
1897	896,735	13,867,093	15.5	5,838,046	50,591	981,340	19.4	639,834
1896	829,601	17,493,148	21.1	7,696,985	68,369	1,197,535	17.5	819,114
1895	799,963	15,568,103	19.5	8,531,320	72,747	1,494,179	20.5	1,414,988
1894	785,007	14,022,888	17.9	7,516,268	59,281	827,514	14.0	913,575
1893	738,741	14,168,955	19.2	7,651,236	48,858	664,310	13.6	783,886
1892	774,732	14,494,430	18.7	8,551,714	33,249	535,931	16.1	529,500
1891	752,453	18,323,459	24.4	11,690,367	41,451	769,600	18.6	816,546
1890	781,206	15,389,313	19.7	9,279,756	39,456	761,341	19.3	978,323
1889	708,068	13,509,237	19.1	7,524,645	21,830	371,893	17.0	471,188
1888	696,653	14,269,863	20.5	9,332,490	22,700	534,526	23.5	607,756
1887	726,756	12,173,332	16.8	6,804,892	20,275	275,975	13.6	270,180
1886	703,936	16,043,734	22.8	8,439,004	21,072	482,072	22.9	403,494
1885	646,081	14,006,192	21.7	8,123,591	24,651	496,564	20.1	397,251
1884	570,928	13,691,607	24.0	8,817,395	24,878	592,044	23.8	698,612
1883	542,771	10,673,723	19.7	7,578,343	25,907			
1882*	560,770	11,006,115	19.6	8,144,525	19,787	409,910	20.7	807,523
Annual Averages:								
1922–1926	117,048	2,210,313	18.9	3,186,259	49,195	817,367	16.6	1,884,304
1912–1921	134,576	2,203,352	16.4	3,797,312	58,729	806,805	13.7	2,866,760
1902–1911	389,104	7,056,642	18.1	5,275,196	50,006	854,999	17.1	1,263,012
1892–1901	769,819	14,242,404	18.5	7,613,480	51,654	875,597	17.0	818,381
1882–1891	668,962	13,908,658	20.8	8,573,501	26,201	469,393	17.9	545,087
1882–1926	449,108	8,659,158	19.1	5,967,249	46,931	758,995	16.2	1,430,087

STATISTICS OF FARM CROPS

Rye and Buckwheat

The following table gives the area, produce and market value of Rye and Buckwheat for the years 1882 to 1926, together with the annual average for the various periods of ten years and the average for the forty-five years.

Years	Rye				Buckwheat			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
1926	86,355	1,501,390	17.4	1,309,840	234,870	4,975,192	21.2	3,830,695
1925	98,652	1,784,625	18.1	1,553,529	257,932	5,579,109	21.6	4,086,236
1924	126,641	2,299,545	18.2	2,471,369	240,552	6,449,496	26.8	5,593,465
1923	123,354	2,011,325	16.3	1,481,691	230,276	5,012,010	21.8	3,670,511
1922	152,709	2,500,354	16.4	1,959,112	197,812	4,266,215	21.6	3,137,448
1921	122,868	1,775,599	14.5	1,467,086	147,944	3,354,201	22.7	2,482,999
1920	133,090	2,349,880	17.7	3,336,240	143,204	3,190,478	22.3	3,367,161
1919	140,072	2,219,042	15.8	3,531,031	178,569	4,071,959	22.8	5,727,413
1918	112,726	1,812,909	16.1	2,750,561	223,662	4,597,990	20.6	6,207,986
1917	133,077	2,222,325	16.7	3,614,591	153,457	2,992,391	19.5	4,278,256
1916	148,738	2,354,410	15.8	2,797,290	229,205	3,261,888	14.2	3,555,699
1915	173,736	3,210,512	18.5	2,532,051	193,497	4,278,366	22.1	3,057,398
1914	138,913	2,315,532	16.7	1,965,522	177,227	4,251,421	24.0	3,041,564
1913	118,429	1,979,775	16.7	1,310,306	228,279	4,012,418	17.6	2,549,398
1912	105,949	1,839,675	17.4	1,287,208	205,893	5,414,796	26.3	2,950,001
1911	98,652	1,562,971	15.8	1,326,510	189,039	3,852,231	20.4	2,324,992
1910	95,397	1,620,333	17.0	1,024,787	194,913	4,693,881	24.1	2,346,387
1909	94,661	1,573,921	16.6	1,060,566	176,630	4,280,790	24.2	2,284,440
1908	87,908	1,453,616	16.5	1,012,953	140,605	3,323,668	23.6	1,799,890
1907	67,158	1,039,021	15.5	721,081	113,039	2,546,468	22.5	1,461,673
1906	79,870	1,327,582	16.6	808,497	106,444	1,792,903	16.8	887,487
1905	101,292	1,714,951	16.9	974,092	101,591	2,199,652	21.7	1,099,826
1904	130,702	2,001,826	15.3	1,153,052	100,608	2,066,234	20.5	1,004,190
1903	179,277	2,970,768	16.6	1,443,793	95,487	2,049,169	21.5	907,782
1902	189,318	3,509,332	18.5	1,772,213	93,324	1,911,683	20.5	917,608
1901	158,236	2,545,268	16.1	1,254,817	88,266	1,757,071	19.9	850,422
1900	142,213	2,357,635	16.6	1,143,453	102,570	1,874,261	18.3	819,052
1899	137,824	2,284,846	16.6	1,142,423	132,082	2,203,299	16.7	1,002,501
1898	165,089	2,673,234	16.2	1,162,857	150,394	2,373,645	15.8	906,732
1897	187,785	3,382,005	18.0	1,275,016	151,669	3,464,186	22.8	1,039,256
1896	148,680	2,230,873	15.0	816,500	145,606	2,603,669	17.9	794,119
1895	120,350	1,900,117	15.8	866,453	135,262	2,791,749	20.6	1,027,364
1894	90,144	1,386,606	15.4	612,880	145,268	2,534,335	17.4	993,459
1893	68,486	994,771	14.5	472,516	133,828	2,380,456	17.8	995,031
1892	73,073	1,132,504	15.5	631,937	125,104	2,521,214	20.2	1,063,952
1891	67,865	1,134,630	16.7	820,337	107,879	2,608,142	24.2	1,150,191
1890	103,061	1,563,345	15.2	823,883	90,111	2,053,720	22.8	883,100
1889	90,106	1,431,679	15.9	728,725	56,398	1,272,578	22.6	502,668
1888	84,087	1,295,302	15.4	779,772	57,528	1,222,283	21.2	602,585
1887	68,362	894,887	13.1	442,969	64,143	1,025,353	16.0	461,409
1886	67,779	1,106,462	16.3	577,573	70,792	1,678,708	23.7	565,725
1885	78,293	1,271,506	16.2	701,871	61,776	1,530,675	24.8	600,024
1884	103,416	1,648,259	15.9	984,010	65,836	1,484,570	22.5	593,828
1883	188,111	3,012,240	16.0	2,018,201	67,802	....	....	....
1882	185,276	3,473,799	18.7	2,223,231	50,035	1,262,973	25.2	505,189
Annual Averages:								
1922–1926	117,542	2,019,448	17.2	1,755,108	232,288	5,256,404	22.6	4,063,671
1912–1921	132,760	2,207,966	16.6	2,459,189	188,094	3,942,591	21.0	3,721,788
1902–1911	112,424	1,877,432	16.7	1,129,754	131,168	2,871,668	21.9	1,503,428
1892–1901	129,188	2,088,786	16.2	937,885	131,005	2,450,389	18.7	949,189
1882–1891	103,636	1,683,211	16.2	1,010,057	69,230	1,413,900	20.4	586,472
1882–1926	119,284	1,970,471	16.5	1,425,431	141,254	2,957,055	20.9	1,953,936

STATISTICS OF FARM CROPS

Flax and Mixed Grains.

The following table gives the area, produce and market value of Flax and Mixed Grains for the years 1907 to 1926, together with the average for the various periods and for the whole term of years.

Years	Flax				Mixed Grains			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
1926	7,712	75,736	9.8	148,149	770,981	28,577,629	37.1	18,697,998
1925	9,789	123,134	12.6	262,386	681,624	28,246,057	41.4	16,559,729
1924	6,619	77,801	11.8	162,590	645,622	26,403,332	40.9	18,231,508
1923	6,766	68,684	10.2	140,376	648,934	23,880,889	36.8	14,290,315
1922	4,556	48,662	10.7	106,046	552,399	21,270,479	38.5	11,882,085
1921	7,534	66,748	8.9	130,995	618,289	16,188,510	26.2	10,579,352
1920	21,053	224,893	10.7	515,983	581,689	25,712,447	44.2	20,556,442
1919	13,717	129,461	9.4	670,608	628,761	19,735,287	31.4	26,403,773
1918	15,925	196,221	12.3	*1,224,783	619,389	27,462,374	44.3	28,253,556
1917	7,372	....	....	....	515,593	20,102,421	39.0	20,876,501
1916	5,880	....	....	....	485,986	13,297,354	27.4	12,485,065
1915	5,334	....	....	....	475,738	19,461,609	40.9	10,602,271
1914	6,025	....	....	....	456,631	16,854,550	36.9	10,074,687
1913	7,431	....	....	....	414,517	15,113,480	36.5	7,953,111
1912	9,125	....	....	....	448,402	16,382,161	36.5	8,674,724
1911	12,128	....	....	....	486,112	14,845,595	30.5	9,104,141
1910	12,021	....	....	....	497,936	18,261,803	36.7	9,187,822
1909	11,253	....	....	....	474,530	16,199,434	34.1	8,825,196
1908	8,562	....	....	....	456,049	15,354,350	33.7	8,444,893
1907	9,296	....	....	....	443,100	14,202,511	32.1	7,811,381
Annual Averages:								
1922–1926	*7,088*	*78,803*	*11.1*	*163,909*	*659,912*	*25,675,677*	*38.9*	*15,932,327*
1912–1921	9,940	....	....	....	524,500	19,031,019	36.3	15,645,948
1907–1911	*10,652*	....	....	....	*471,545*	*15,772,739*	*33.4*	*8,674,687*
1907–1926	*9,405*	....	....	....	*545,114*	*19,877,614*	*36.5*	*13,974,728*

*Including seed of fibre variety commandeered and shipped to Ireland to the value of $930,769.

No estimates of yields of flax were made previous to 1918. The average for the nine years, 1918–1926, was 10,408 acres, yielding 112,371 bushels, valued at $373,546.

STATISTICS OF FARM CROPS

Husking Corn and Silo Corn

The following table gives the area, produce and market value of *Corn (for husking and for silo) for the years 1892 to 1926, together with the annual averages for the various periods of ten years and the average for the thirty-five years.

Years	Corn for Husking				Corn for Silo			
	Acres	Bushels in the ear	Per acre	Market value	Acres	Tons, green	Per acre	Market value
				$				$
1926..	179,325	10,329,439	57.6	5,529,069	367,772	3,497,071	9.51	15,736,820
1925..	207,767	14,604,467	70.3	8,131,617	373,133	3,614,233	9.69	15,360,490
1924...	263,615	16,711,996	63.4	11,737,059	403,060	3,977,017	9.87	17,896,577
1923..	285,335	19,292,244	67.6	9,710,461	409,628	3,651,102	8.91	14,604,408
1922...	265,018	18,459,363	69.7	8,609,503	438,819	4,413,191	10.06	17,652,764
1921..	250,684	20,313,661	81.0	8,012,455	438,343	5,015,082	11.44	25,075,410
1920...	243,909	19,372,277	79.4	12,867,119	449,176	4,668,054	10.39	23,340,270
1919...	221,004	15,152,475	68.6	16,400,838	399,549	4,013,946	10.05	20,069,730
1918...	195,310	13,015,072	66.6	13,650,415	380,946	3,944,313	10.35	17,749,409
1917...	258,935	11,513,512	44.5	14,278,407	511,329	4,587,176	8.97	18,348,704
1916...	258,332	12,717,072	49.2	9,446,060	439,411	3,276,185	7.46	10,647,610
1915...	309,773	21,760,496	70.2	9,885,292	443,736	4,874,377	10.98	12,185,943
1914....	290,817	23,232,360	80.0	10,622,455	418,105	4,751,223	11.36	11,878,058
1913...	299,871	22,214,014	74.1	9,545,538	388,138	4,059,345	10.46	10,148,363
1912...	301,251	21,969,468	72.9	8,162,565	377,982	3,969,597	10.50	9,923,993
1911....	308,350	21,913,290	71.7	9,693,994	335,935	3,764,227	11.21	9,410,568
1910....	320,519	24,900,386	77.7	9,301,245	326,627	3,788,364	11.60	7,576,728
1909.....	322,789	22,619,690	70.1	9,705,826	288,346	3,374,655	11.70	6,749,310
1908...	299,690	23,601,122	78.8	9,440,336	233,753	2,729,265	11.68	5,458,530
1907...	338,573	21,899,466	64.7	6,219,448	200,354	2,029,547	10.13	4,059,094
1906...	289,456	23,988,682	82.9	9,019,744	180,796	2,149,413	11.89	4,298,826
1905....	295,005	20,922,919	70.9	7,720,557	184,784	2,284,812	12.36	4,569,624
1904.....	329,882	20,241,914	61.4	7,570,476	193,115	2,023,340	10.48	4,046,680
1903....	378,924	29,287,888	77.3	10,807,230	209,727	2,564,400	12.23	5,128,800
1902.....	371,959	20,512,194	55.1	8,327,951	209,859	2,611,334	12.44	5,222,668
1901.....	323,923	24,838,105	76.7	9,438,480	197,932	2,359,514	11.92	4,719,028
1900.....	330,772	27,093,561	81.9	8,588,659	179,798	2,147,532	11.94	4,295,064
1899......	333,590	21,673,234	65.0	4,291,300	171,935	1,697,755	9.87	3,395,510
1898....	330,748	23,442,593	70.9	4,711,961	189,948	2,128,073	11.20	4,256,146
1897.....	335,030	24,663,998	73.6	4,858,808	209,005	2,669,822	12.77	5,339,644
1896.....	317,667	24,071,364	75.8	4,717,987	178,962	1,948,780	10.89	3,897,560
1895....	302,929	24,819,899	81.9	5,609,297	149,899	1,775,654	11.85	3,551,308
1894....	267,348	16,275,352	60.9	4,247,867	111,361	1,049,765	9.43	2,099,530
1893....	217,294	14,072,961	64.8	3,729,335	95,865	1,049,524	10.95	2,099,048
1892....	181,463	11,229,498	61.9	2,953,358	91,403	948,907	10.38	1,897,814
Annual Averages:								
1922–1926...	240,212	15,879,502	66.1	8,743,542	398,482	3,830,523	9.61	16,250,212
1912–1921.	262,989	18,126,041	68.9	11,287,114	424,672	4,315,930	10.16	15,936,749
1902–1911..	325,515	22,988,755	70.6	8,780,681	236,330	2,731,936	11.56	5,652,083
1892–1901...	294,076	21,218,057	72.2	5,314,705	157,611	1,777,533	11.28	3,555,065
1892–1926..	286,482	20,077,887	70.1	8,501,220	290,815	3,068,760	10.55	9,505,429

*The combined average area for corn for the ten years 1882–1891 was 195,878 acres, the average value of the produce for the same period being $3,704,614. The combined average for corn for the forty-five years, 1882–1926, is 492,537 acres, the average value of the produce for the same period being $14,828,419.

STATISTICS OF FARM CROPS

Potatoes and Turnips

The following table gives the area, produce and market value of Potatoes and Turnips for the years 1882 to 1926, together with the annual averages for the various periods of ten years and the average for the forty-five years.

Years	Potatoes				Turnips			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
1926	153,468	16,496,290	107.5	18,627,771	71,500	23,204,013	325	4,640,803
1925	163,790	15,714,786	95.9	21,513,125	73,318	28,015,466	382	5,042,784
1924	169,145	24,966,530	147.6	13,355,441	70,110	32,547,607	464	5,533,093
1923	164,682	19,131,980	116.2	14,306,447	65,193	27,099,910	416	5,419,982
1922	172,858	20,349,541	117.7	10,385,525	67,635	29,923,528	442	5,984,706
1921	164,096	15,400,142	93.8	13,589,599	70,715	24,265,547	343	6,673,025
1920	157,509	23,961,709	152.1	23,776,530	80,588	40,141,406	498	11,038,887
1919	157,286	15,144,921	96.3	25,026,467	85,312	28,740,526	337	7,903,645
1918	166,203	19,375,947	116.6	19,238,431	85,449	42,190,382	494	10,547,596
1917	146,481	18,291,735	124.9	22,530,291	93,034	39,989,556	430	7,997,911
1916	139,523	7,408,429	53.1	9,684,215	91,670	24,067,699	263	3,369,478
1915	173,934	13,267,023	76.3	10,805,026	97,451	46,598,851	478	4,659,885
1914	167,591	26,717,587	159.4	11,747,332	95,371	46,336,708	486	4,633,671
1913	159,661	19,024,115	119.2	12,114,656	97,572	41,889,894	429	4,188,989
1912	158,888	21,346,394	134.3	13,604,052	101,529	49,561,566	488	4,956,157
1911	162,457	13,918,698	85.7	11,722,539	100,593	39,664,275	394	3,966,428
1910	168,454	21,927,804	130.2	10,798,597	108,360	49,425,472	456	4,942,547
1909	169,695	24,645,283	145.2	8,989,452	113,400	50,738,940	447	5,073,894
1908	166,974	18,517,642	110.9	8,874,201	120,920	41,210,189	341	4,121,019
1907	177,186	20,057,675	113.2	11,693,625	123,011	48,205,605	392	4,820,561
1906	136,064	15,020,299	110.4	8,080,921	132,512	57,060,151	431	5,706,015
1905	132,530	14,366,049	108.4	6,608,383	135,348	57,654,086	426	5,765,409
1904	133,819	15,479,122	115.7	7,847,915	133,207	64,861,703	487	6,486,170
1903	139,011	16,676,447	120.0	7,354,313	134,469	69,316,341	515	6,931,634
1902	144,733	12,942,502	89.4	7,312,514	136,725	71,740,204	525	7,174,020
1901	154,155	18,116,637	117.5	7,717,687	145,909	68,287,467	468	6,828,747
1900	163,754	21,476,439	131.2	5,605,351	156,583	59,330,395	379	5,933,040
1899	168,148	19,933,366	118.5	6,538,144	153,440	58,078,390	379	5,807,839
1898	169,946	14,358,625	84.5	6,332,154	151,601	64,727,882	427	6,472,788
1897	169,333	16,100,797	95.1	6,424,218	149,336	68,297,148	457	6,829,715
1896	178,965	21,305,477	119.0	5,582,035	148,234	69,814,841	471	6,981,484
1895	184,647	29,390,884	159.2	5,936,959	151,806	63,496,702	418	6,349,670
1894	167,253	17,163,130	102.6	6,075,748	147,657	61,694,487	418	6,169,449
1893	142,601	12,911,212	90.5	5,099,929	136,604	56,975,355	417	5,697,535
1892	145,703	12,289,817	84.3	6,194,068	129,627	63,541,641	490	6,354,164
1891	160,218	24,055,886	150.1	7,842,219	126,075	68,853,452	546	6,885,345
1890	158,094	17,561,117	111.1	7,779,575	111,055	47,040,563	424	4,704,056
1889	145,812	14,355,529	98.5	6,531,766	111,103	37,021,260	333	3,702,126
1888	153,915	22,273,607	144.7	7,060,733	113,188	47,640,237	421	4,764,024
1887	140,283	10,678,000	76.1	6,705,784	105,322	31,413,456	298	3,141,346
1886	140,143	16,012,358	114.3	7,189,548	98,931	47,061,053	476	4,706,105
1885	159,741	21,091,144	132.0	8,668,460	102,303	41,137,735	402	4,113,774
1884	168,757	27,546,261	163.2	11,018,504	104,199	44,406,363	426	4,440,636
1883	166,823	16,400,782	98.3	10,168,485	98,429	29,879,354	304	2,987,935
1882	160,700	18,432,145	114.7	11,796,573	78,823	35,359,331	448	3,535,933
Annual Averages:								
1922–1926	164,789	19,331,825	117.3	15,637,662	69,551	28,158,105	405	5,324,274
1912–1921	159,117	17,993,800	113.1	16,211,660	89,869	38,378,214	427	6,596,924
1902–1911	153,092	17,355,152	113.4	8,928,246	123,855	54,987,697	444	5,498,770
1892–1901	164,451	18,304,638	111.3	6,150,629	147,080	63,424,431	431	6,342,443
1882–1891	155,449	18,840,683	121.2	8,476,165	104,943	42,981,280	410	4,298,128
1882–1926	158,778	18,257,819	115.0	10,574,562	111,227	47,522,372	427	5,644,089

STATISTICS OF FARM CROPS

Mangels and Sugar Beets

The following table gives the area, produce and market value of Mangels for the years 1882 to 1926, and of Sugar Beets for the years 1907 to 1926, together with the annual average for the various periods of ten years and the average for the full period.

Years	Mangels				Sugar Beets			
	Acres	Bushels	Per acre	Market value	Acres	Bushels	Per acre	Market value
				$				$
1926	34,009	13,548,484	398	2,709,697	41,594	18,831,084	453	3,766,217
1925	35,385	14,881,069	421	2,678,592	37,718	16,686,713	442	3,003,608
1924	35,958	15,616,128	434	2,654,742	36,080	13,346,456	370	2,272,570
1923	35,118	14,865,791	423	2,973,158	22,450	8,647,615	385	1,729,523
1922	35,274	16,366,353	464	3,273,271	20,725	7,616,281	367	1,523,246
1921	31,225	11,909,854	381	3,275,210	28,367	10,712,975	378	2,946,068
1920	36,450	17,174,290	471	4,722,930	36,288	16,497,067	455	4,536,693
1919	35,010	13,409,270	383	3,687,549	24,500	9,586,495	391	2,636,286
1918	40,714	18,244,453	448	4,561,113	22,894	9,398,141	411	2,349,535
1917	49,148	19,492,626	397	3,898,525	22,039	6,781,113	308	1,356,223
1916	42,793	9,756,015	228	1,365,842	22,482	6,023,938	268	843,351
1915	50,799	25,356,323	498	2,028,506	22,890	8,644,281	378	1,080,535
1914	50,663	25,439,520	502	2,035,162	18,534	7,466,819	403	933,352
1913	54,568	21,935,847	402	1,754,868	19,083	6,389,177	335	798,647
1912	60,103	27,671,114	460	2,213,689	21,054	7,819,066	371	977,383
1911	64,855	28,126,313	434	2,250,105	24,664	8,941,659	363	1,117,707
1910	68,966	34,686,137	503	2,774,891	26,879	11,238,577	418	1,348,629
1909	70,488	28,928,347	410	2,314,267	19,812	7,001,565	353	840,188
1908	67,937	29,870,966	440	2,389,677	17,453	7,004,748	401	840,570
1907	68,644	30,260,315	441	2,420,825	16,851	8,237,044	489	988,445
1906	69,352	32,863,192	474	2,629,055	......	......	...	......
1905	69,035	33,216,930	481	2,657,354	......	......	...	......
1904	71,344	33,595,440	471	2,687,635	......	......	...	......
1903	80,918	41,768,239	516	3,341,459	......	......	...	......
1902	76,553	39,140,924	511	3,131,274	......	......	...	......
1901	61,095	29,683,324	486	2,374,666	......	......	...	......
1900	54,543	24,728,525	453	1,978,282	......	......	...	......
1899	53,401	20,898,387	391	1,671,871	......	......	...	......
1898	47,923	21,957,564	458	1,756,605	......	......	...	......
1897	41,175	18,103,387	440	1,448,271	......	......	...	......
1896	36,101	16,849,401	467	1,347,952	......	......	...	......
1895	34,383	15,961,502	464	1,276,920	......	......	...	......
1894	27,670	11,532,127	417	922,570	......	......	...	......
1893	21,519	8,582,568	399	686,605	......	......	...	......
1892	22,026	10,350,474	470	828,038	......	......	...	......
1891	22,961	11,779,448	513	942,356	......	......	...	......
1890	25,953	11,594,518	447	927,561	......	......	...	......
1889	21,211	7,223,478	341	577,878	......	......	...	......
1888	21,459	10,020,659	467	801,653	......	......	...	......
1887	17,924	5,695,761	318	455,661	......	......	...	......
1886	18,170	8,787,743	484	703,019	......	......	...	......
1885	16,435	7,660,729	466	612,858	......	......	...	......
1884	18,341	8,655,184	472	692,415	......	......	...	......
1883	17,219	6,252,015	363	500,161	......	......	...	......
1882	15,792	7,711,420	488	616,913	......	......	...	......
Annual Averages:								
1922–1926	35,149	15,055,565	428	2,857,892	31,713	13,025,630	411	2,459,033
1912–1921	45,147	19,038,931	422	2,954,339	23,813	8,931,907	375	1,845,807
1902–1911	70,809	33,245,680	470	2,659,654	*21,132	*8,484,719	*402	*1,027,108
1892–1901	39,984	17,864,726	447	1,429,178	......	......	...	......
1882–1891	19,546	8,538,096	437	683,048	......	......	...	......
1882–1926	42,902	19,158,937	447	2,034,481	†25,118	†9,843,541	†392	†1,794,439

*1907–11. †1907-26.

STATISTICS OF FARM CROPS

Alfalfa and Hay and Clover

The following table gives the area, produce and market value of Alfalfa for the years 1912 to 1926 and of Hay and Clover for the years 1882 to 1926, together with the annual average for the various periods of ten years and the average for the whole period.

Years	Alfalfa				Hay and Clover			
	Acres	Tons	Per acre	Market value	Acres	Tons	Per acre	Market value
				$				$
1926	748,473	1,850,392	2.47	25,889,781	†2,889,143	4,248,048	1.47	54,154,454
1925	550,645	1,397,462	2.54	19,306,047	†3,022,507	4,181,206	1.38	50,738,655
1924	381,258	1,067,717	2.80	12,252,536	3,545,856	5,615,238	1.58	61,283,373
1923	299,610	788,431	2.63	8,915,438	3,596,484	5,799,422	1.61	64,069,155
1922	221,326	629,135	2.84	7,43[illegible],403	3,575,662	5,568,459	1.56	66,964,036
1921	177,205	456,378	2.58	8,023,795	3,551,655	3,954,166	1.11	76,193,216
1920	162,820	399,581	2.45	10,172,434	3,533,740	4,459,094	1.26	109,036,159
1919	146,790	314,419	2.14	7,293,462	3,508,266	5,588,804	1.59	126,750,915
1918	144,010	328,971	2.28	6,579,420	3,470,036	4,596,854	1.32	83,344,591
1917	189,109	462,956	2.45	5,460,205	3,358,579	6,156,340	1.83	72,705,998
1916	177,565	460,788	2.60	4,822,622	3,294,419	6,739,259	2.05	71,503,879
1915	165,284	428,739	2.59	6,044,599	3,066,468	3,825,024	1.25	55,660,170
1914	163,685	372,759	2.28	5,195,667	3,251,799	3,469,795	1.07	50,721,713
1913	167,707	380,606	2.27	5,090,267	3,261,139	3,543,957	1.09	46,212,298
1912	189,959	460,201	2.42	5,542,772	3,177,410	4,760,512	1.50	55,906,657
1911					3,301,468	4,238,362	1.28	55,767,671
1910					3,204,021	5,492,653	1.71	54,407,105
1909					3,228,445	3,885,145	1.20	49,754,078
1908					3,253,141	4,635,287	1.42	47,696,579
1907					3,289,552	3,891,863	1.18	58,806,050
1906					3,069,917	4,684,625	1.53	42,630,087
1905					3,020,365	5,847,494	1.94	45,142,654
1904					2,926,207	5,259,189	1.80	41,915,736
1903					2,783,565	4,336,562	1.56	34,432,302
1902					2,646,202	4,955,438	1.87	40,386,820
1901					2,557,263	4,632,317	1.81	37,012,213
1900					2,526,566	3,133,045	1.24	26,568,222
1899					2,505,422	3,498,705	1.40	27,010,003
1898					2,453,503	4,399,063	1.79	27,362,172
1897					2,341,488	3,811,518	1.63	27,366,699
1896					2,426,711	2,260,240	.93	21,879,123
1895					2,537,674	1,849,914	.73	22,753,942
1894					2,576,943	3,575,200	1.39	27,028,512
1893					2,766,894	4,963,557	1.79	37,921,575
1892					2,515,367	4,384,838	1.74	35,955,672
1891					2,549,975	2,392,798	.94	28,498,224
1890					2,462,002	4,305,915	1.75	34,232,024
1889					2,386,223	3,728,313	1.56	37,208,564
1888					2,292,638	2,009,017	.88	33,570,674
1887					2,280,643	3,093,610	1.36	35,947,748
1886					2,295,151	2,994,446	1.35	29,016,182
1885					2,268,091	3,252,155	1.43	32,033,727
1884					2,193,369	3,044,912	1.39	29,109,359
1883					2,350,969	4,115,535	1.75	37,122,126
1882					1,825,890	2,090,626	1.14	24,125,824
Annual Averages								
1922–1926	440,262	1,146,627	2.60	14,760,641	3,430,230	5,292,872	1.54	61,441,915
1912–1921	168,413	406,540	2.41	6,422,524	3,347,351	4,709,381	1.41	74,803,560
1902–1911					*3,072,288	4,722,662	1.54	47,093,908
1892–1901					*2,520,783	3,650,840	1.45	29,085,813
1882–1891					*2,290,495	3,102,733	1.35	32,086,445
1882–1926					2,865,307	4,161,523	1.45	47,286,821

STATISTICS OF FARM CROPS

Carrots and all Field Crops

The following table gives the area, produce and market value of Carrots and of all Field Crops for the years 1882 to 1926, together with the annual average for the various periods of ten years and the average for the whole period.

Years	Carrots				All Field Crops		
	Acres	Bushels	Per acre	Market value	Acres	Value	Per acre
				$		$	$ c.
1926	1,672	253,966	152	50,793	10,434,401	257,686,886	24.70
1925	1,835	325,478	177	58,586	10,364,317	261,490,292	25.23
1924	2,128	402,446	189	68,416	10,264,614	264,370,642	25.76
1923	1,780	285,270	160	57,054	10,296,961	219,114,500	21.28
1922	2,124	472,643	223	94,529	10,258,613	223,342,150	21.77
1921	2,217	410,501	185	112,888	10,075,073	222,177,881	22.05
1920	2,706	674,101	249	185,378	10,108,272	367,608,619	36.37
1919	2,706	605,803	224	166,596	9,915,884	397,238,400	40.06
1918	2,706	689,557	255	172,389	9,992,825	363,909,778	36.42
1917	2,920	758,292	260	151,658	9,718,259	333,353,438	34.30
1916	2,391	331,124	138	46,357	9,548,876	223,748,948	23.43
1915	2,439	686,232	281	85,779	9,762,951	210,674,415	21.58
1914	2,448	766,170	313	95,771	9,621,444	199,152,945	20.70
1913	2,400	592,016	247	74,002	9,541,537	168,455,253	17.65
1912	2,742	747,207	273	93,401	9,574,474	185,790,341	19.40
1911	3,207	815,129	254	101,891	9,718,741	179,974,358	18.52
1910	3,551	1,049,348	296	131,169	9,725,684	175,115,742	18.01
1909	3,506	1,001,653	286	125,207	9,578,323	167,966,577	17.54
1908	4,080	1,120,145	275	140,018	9,621,683	164,077,282	17.05
1907	4,530	1,585,500	350	198,187	9,750,615	176,354,759	18.09
1906	4,980	1,598,698	321	199,837	8,962,925	144,570,075	16.13
1905	5,509	1,846,659	335	230,832	8,897,898	142,804,431	16.05
1904	6,634	2,022,945	305	252,868	8,673,525	134,304,690	15.48
1903	7,805	2,612,778	335	326,597	8,731,405	136,657,807	15.65
1902	8,625	3,227,161	374	403,395	8,677,988	146,421,171	16.87
1901	9,221	3,199,967	347	399,996	8,667,512	128,325,648	14.81
1900	10,320	3,469,123	336	433,640	8,794,953	114,758,761	13.05
1899	11,891	3,674,035	309	459,254	8,753,926	105,771,321	12.08
1898	12,418	4,313,861	347	539,233	8,835,272	110,528,947	12.51
1897	12,025	4,433,628	369	554,204	8,701,705	106,952,471	12.29
1896	12,333	4,618,441	374	577,305	8,511,444	88,900,135	10.44
1895	13,002	4,581,373	352	572,672	8,321,173	99,655,895	11.98
1894	11,186	3,716,140	332	464,518	8,227,153	94,055,392	11.43
1893	9,288	2,971,450	320	371,431	8,054,612	101,886,557	12.65
1892	9,941	3,827,361	385	478,420	8,080,206	110,562,493	13.68
1891	9,858	3,814,016	387	476,752	7,834,213	130,866,023	16.70
1890	11,977	4,210,542	352	526,318	7,912,297	114,382,305	14.46
1889	11,261	3,431,959	305	428,995	7,758,583	106,500,799	13.73
1888	11,524	3,898,584	338	487,323	7,616,350	124,244,503	16.31
1887	9,110	2,105,686	231	263,210	7,429,084	99,583,524	13.40
1886	9,267	3,478,751	375	434,844	7,403,281	104,001,865	14.05
1885	9,024	3,462,319	384	432,790	7,350,443	110,068,586	14.97
1884	10,987	4,197,200	382	524,650	7,203,958	120,615,798	16.74
1883	11,270	3,984,436	354	498,055	7,542,623	114,754,141	15.21
1882	9,955	4,009,975	403	501,247	7,125,223	136,939,533	19.22
Annual Averages:							
1922–1926	1,908	347,961	182	65,876	10,323,781	245,200,894	23.75
1912–1921	2,568	626,100	244	118,422	*9,785,960	*267,211,002	27.31
1902–1911	5,243	1,688,002	322	211,000	9,233,879	156,824,689	16.98
1892–1901	11,163	3,880,538	348	485,068	8,494,796	106,139,762	12.49
1882–1891	10,243	3,659,347	351	457,417	7,517,606	116,195,708	15.48
1882–1926	6,744	2,228,437	330	289,966	8,932,029	170,882,579	19.13

*Including Flax, 1918–1921.

STATISTICS OF FARM CROPS

Ratios of Areas under Crop

The following table shows the number of acres under the various crops per 1,000 acres of cleared land for the years 1882 to 1926, together with the averages for the various periods of ten years and for the whole term of years.

Year	Fall Wheat	Spring Wheat	Barley	Oats	Peas	Beans	Rye	Buckwheat	Corn	Potatoes	*Roots	Hay and Clover	Mixed Grains
1926	53.4	7.6	29.7	187.3	6.5	3.4	5.7	15.5	36.2	10.2	9.8	191.1	51.0
1925	49.5	7.5	28.9	187.9	8.8	4.0	6.5	17.1	38.5	10.8	9.8	234.7	45.1
1924	47.9	6.7	29.1	191.7	8.7	3.5	8.4	15.9	44.2	11.2	9.6	235.1	42.8
1923	47.6	7.4	30.1	197.1	7.8	2.7	8.2	15.3	46.2	10.9	8.3	238.9	43.1
1922	54.2	8.3	28.9	202.1	7.0	2.7	10.2	13.2	46.9	11.5	8.4	238.1	36.8
1921	41.4	10.2	30.8	206.1	7.1	1.8	8.2	9.9	45.9	10.9	8.8	236.5	41.2
1920	51.0	17.9	32.4	192.5	7.3	1.5	8.9	9.6	46.3	10.5	10.4	247.1	38.9
1919	41.6	24.2	38.2	179.5	8.5	1.5	9.4	12.0	41.7	10.6	9.9	245.3	42.2
1918	24.5	23.8	44.6	197.6	7.7	6.8	7.6	15.1	38.9	11.2	10.3	244.2	41.9
1917	39.8	12.4	37.4	187.6	6.1	7.5	9.0	10.4	52.3	10.0	11.4	240.9	35.0
1916	47.9	9.8	35.9	183.0	6.5	3.7	10.1	15.6	47.5	9.5	10.8	236.2	33.1
1915	55.5	11.1	37.8	196.4	8.7	4.3	11.9	13.2	51.5	11.9	11.9	221.0	32.5
1914	47.0	8.1	39.7	190.2	12.2	3.5	9.5	12.1	48.6	11.5	11.5	234.0	31.3
1913	44.5	8.0	43.0	186.0	12.2	4.6	8.2	15.7	47.4	11.0	12.0	236.2	28.5
1912	52.6	8.5	44.8	180.1	15.3	4.8	7.4	14.3	47.0	11.0	12.8	233.1	31.0
1911	58.2	9.3	42.9	187.7	21.2	3.6	6.9	13.1	44.8	11.3	13.4	229.6	33.8
1910	51.9	9.0	43.7	192.5	28.2	3.5	6.6	13.6	45.2	11.8	14.5	223.7	34.8
1909	46.5	9.5	48.8	189.0	26.7	3.2	6.6	12.4	42.9	11.9	14.5	226.5	33.3
1908	48.1	10.1	51.9	196.3	28.1	3.3	6.2	9.9	37.7	11.8	14.9	230.2	32.3
1907	47.9	10.2	54.3	207.7	24.1	3.4	4.8	8.0	38.2	12.6	15.1	233.0	31.4
1906	55.8	12.2	53.6	192.6	29.1	3.6	5.7	7.5	33.3	9.7	14.7	217.6	.....
1905	57.2	13.6	55.5	191.5	26.9	3.6	7.3	7.3	34.4	9.5	15.1	216.8	.....
1904	43.8	16.3	55.9	192.2	24.6	3.7	9.5	7.3	37.9	9.7	15.3	211.9	.....
1903	48.8	18.2	52.0	193.4	29.9	3.9	13.1	7.0	43.2	10.2	16.4	204.0	.....
1902	55.2	22.3	48.8	184.3	39.2	4.0	13.9	6.9	42.9	10.7	16.3	195.0	.....
1901	67.8	26.6	47.4	179.3	44.9	4.0	11.8	6.6	38.8	11.5	16.1	190.3	.....
1900	80.4	28.3	43.4	180.4	49.8	3.3	10.7	7.7	38.4	12.3	16.7	190.0	.....
1899	80.1	30.4	37.4	180.3	56.7	3.1	10.5	10.1	38.6	12.8	16.6	191.1	.....
1898	80.7	30.0	33.8	182.9	66.6	3.4	12.7	11.5	40.1	13.1	16.4	188.8	.....
1897	73.9	25.2	35.1	189.3	69.8	3.9	14.6	11.8	42.3	13.2	15.7	182.2	.....
1896	69.2	20.2	36.5	191.4	65.5	5.4	11.7	11.5	39.2	14.1	15.4	191.5	.....
1895	59.8	18.0	38.5	191.0	64.4	5.8	9.7	10.9	36.4	14.9	16.0	204.2	.....
1894	63.4	18.7	39.6	190.6	63.9	4.8	7.3	11.8	30.8	13.6	15.2	209.6	.....
1893	75.5	29.4	38.6	159.9	61.0	4.0	5.6	11.0	25.9	11.8	13.9	228.4	.....
1892	80.6	54.3	41.7	155.3	64.6	2.8	6.1	10.4	22.8	12.2	13.4	209.8	.....
1891	72.0	43.3	46.9	156.0	63.8	3.5	5.7	9.1	20.4	13.6	13.4	216.1	.....
1890	61.8	51.6	60.2	161.5	67.0	3.4	8.8	7.7	19.2	13.6	12.7	211.2	.....
1889	71.6	34.7	76.3	167.6	61.7	1.9	7.9	4.9	16.3	12.7	12.5	208.0	.....
1888	73.2	32.5	79.2	163.6	61.6	2.0	7.4	5.1	19.7	13.6	12.9	202.8	.....
1887	80.8	43.6	69.1	151.5	65.4	1.9	6.2	5.8	14.7	12.6	11.9	205.3	.....
1886	81.0	52.8	67.3	148.3	64.4	1.9	6.2	6.5	14.3	12.8	11.5	209.8	.....
1885	80.6	73.6	55.1	142.2	59.5	2.3	7.2	5.7	15.5	14.7	11.7	208.9	.....
1884	80.5	67.2	65.2	138.0	53.2	2.3	9.6	6.7	16.3	15.7	12.4	204.3	.....
1883	104.1	55.6	71.8	134.6	51.5	2.5	17.8	6.4	20.3	15.8	12.0	223.1	.....
1882	116.8	57.7	83.4	136.4	55.1	1.9	18.2	4.9	20.3	15.8	10.3	179.5	.....
Annual average:													
1922–1926	50.5	7.5	29.3	198.2	7.8	3.3	7.8	15.4	42.4	10.9	9.2	227.6	43.8
1912–1921	44.5	13.4	38.4	189.9	9.1	4.0	9.0	12.9	46.6	10.8	11.0	237.5	35.6
1902–1911	51.3	13.0	50.7	192.8	27.7	3.6	8.0	9.4	40.1	10.9	15.8	219.0	†33.1
1892–1901	73.2	28.0	39.2	180.2	60.5	4.1	10.1	10.3	35.5	12.9	15.6	198.2	.....
1882–1891	81.6	50.9	67.2	150.4	60.5	2.4	9.4	6.2	17.7	14.0	12.2	207.1	.....
1882–1926	59.9	22.7	45.7	181.6	33.8	3.5	9.0	10.6	36.9	11.9	13.9	220.4	‡37.0

*Mangels, turnips, carrots and sugar beets. †1907–1911. ‡1907–1926.

STATISTICS OF FARM CROPS

Market Prices

The following table gives the average Market Prices of Agricultural products for the years 1882 to 1926, together with the averages for the various periods of ten years, and for the whole term of years.

Years	Fall Wheat per bush.	Spring Wheat per bush.	Oats per bush.	Barley per bush.	Peas per bush.	Beans per bush.	Rye per bush.	Buckwheat per bush.	Corn (in ear) per bush.	Hay per ton.	Potatoes per bush.
	cents	cents	cents	cents	cents	$ c.	cents	cents	cents	$ c.	cents
1926	125.1	125.1	51.8	68.0	150.6	2.34	87.2	77.0	53.5	12.75	112.9
1925	133.6	133.0	45.2	68.1	135.5	2.11	87.1	73.2	55.7	11.61	136.9
1924	133.9	137.0	54.2	82.2	151.1	2.29	107.5	86.7	70.2	10.91	53.5
1923	96.2	96.3	45.4	62.8	144.8	2.43	73.7	73.2	50.3	11.05	74.8
1922	104.6	105.1	43.5	61.3	140.3	2.54	78.4	73.5	46.6	12.03	51.0
1921	110.5	109.4	50.4	65.7	153.0	2.35	82.6	74.0	39.4	19.27	88.2
1920	193.4	183.8	58.2	93.8	193.3	2.88	142.0	105.5	66.4	24.25	99.2
1919	237.2	240.9	97.7	145.8	263.9	4.00	159.1	140.7	108.2	22.68	165.2
1918	210.9	208.6	75.0	103.6	217.7	4.49	151.7	135.0	104.9	18.13	99.3
1917	209.8	209.7	77.9	125.7	321.0	6.91	162.6	142.9	124.0	11.81	123.2
1916	161.3	162.2	66.0	101.9	210.5	5.46	118.8	109.0	74.3	10.60	130.1
1915	97.1	98.6	39.5	56.0	161.6	3.11	78.9	71.5	45.4	14.51	81.4
1914	109.1	107.9	49.5	64.3	136.6	2.14	84.9	71.5	45.7	14.55	44.0
1913	85.0	87.9	36.9	55.5	100.6	1.70	66.2	63.5	43.0	13.07	63.7
1912	91.7	90.0	38.6	58.7	110.3	1.93	70.0	54.5	37.2	11.77	63.7
1911	86.6	90.7	44.2	73.9	98.2	1.90	84.9	60.4	44.2	13.16	84.2
1910	86.6	89.6	35.0	52.0	80.7	1.55	63.2	50.0	37.3	9.91	49.2
1909	102.3	100.6	39.5	54.8	84.6	1.61	67.4	53.4	42.9	12.81	36.5
1908	89.2	90.8	40.3	52.4	82.7	1.48	69.7	54.2	40.0	10.25	47.9
1907	92.7	86.4	48.8	59.4	78.0	1.52	69.4	57.4	28.4	15.11	58.3
1906	70.7	68.9	34.0	45.0	70.6	1.39	60.9	49.5	37.6	9.10	53.8
1905	76.5	74.9	33.6	42.9	65.3	1.32	56.8	50.0	36.9	7.72	46.0
1904	98.7	94.2	32.3	43.7	63.0	1.22	57.6	48.6	37.4	7.97	50.7
1903	75.1	74.4	29.3	42.1	64.3	1.41	48.6	44.3	36.9	7.94	44.1
1902	70.7	69.6	34.8	45.1	71.0	1.35	50.5	48.0	40.6	8.15	56.5
1901	66.1	66.8	36.2	45.0	65.3	1.25	49.3	48.4	38.0	7.99	42.6
1900	66.4	67.5	26.5	38.9	57.1	1.00	48.5	43.7	31.7	8.48	26.1
1899	66.7	66.5	27.7	39.5	57.3	1.08	50.0	45.5	19.8	7.72	32.8
1898	69.4	69.2	25.8	38.0	52.2	.70	43.5	38.2	20.1	6.22	44.1
1897	78.2	78.6	22.6	27.0	42.1	.65	37.7	30.0	19.7	7.18	39.9
1896	71.0	70.6	20.0	31.0	44.0	.68	36.6	30.5	19.6	9.68	26.2
1895	69.3	69.8	29.1	40.4	54.8	.95	45.6	36.8	22.6	12.30	20.2
1894	55.0	55.5	30.8	40.5	53.6	1.10	44.2	39.2	26.1	7.56	35.4
1893	59.9	59.4	33.2	40.1	54.0	1.18	47.5	41.8	26.5	7.64	39.5
1892	70.7	67.8	30.8	41.3	59.0	.99	55.8	42.2	26.3	8.20	50.4
1891	95.1	92.9	36.5	49.1	63.8	1.06	72.3	44.1	31.1	11.91	32.6
1890	94.2	91.3	41.1	50.2	60.3	1.29	52.7	43.0	30.5	7.95	44.3
1889	88.4	88.1	30.5	44.0	55.7	1.27	50.9	39.5	25.9	9.98	45.5
1888	102.4	99.3	40.5	60.1	65.4	1.14	60.2	49.3	29.3	16.17	31.7
1887	78.4	78.0	34.6	56.7	55.9	.98	49.5	45.0	28.7	11.62	62.8
1886	73.6	72.5	32.0	51.3	52.6	.84	52.2	33.7	27.6	9.69	44.9
1885	81.5	80.6	31.5	55.2	58.0	.80	55.2	39.2	27.9	9.85	41.1
1884	80.5	81.4	33.1	53.6	64.4	1.18	59.7	40.0	45.0	9.56	40.0
1883	105.0	107.0	38.0	57.0	71.0	......	62.0	......	......	9.02	62.0
1882	101.0	106.0	43.0	65.0	74.0	1.97	64.0	40.0	40.0	11.54	64.0
Annual Averages:											
1922–1926	120.5	119.9	47.9	68.6	144.2	2.31	86.9	77.3	55.1	11.61	80.9
1912–1921	144.5	171.6	58.5	86.0	172.3	2.35	111.4	94.4	62.3	15.88	90.1
1902–1911	83.6	81.2	36.7	50.1	74.8	1.48	60.2	52.4	38.2	9.97	51.4
1892–1901	67.8	67.5	27.9	38.5	53.5	.93	44.9	38.7	25.0	7.97	33.6
1882–1891	90.0	89.6	34.3	54.5	61.6	1.16	60.0	41.5	......	10.34	45.0
1882–1926	97.8	97.8	42.0	58.7	69.7	1.88	72.3	66.1	*42.3	11.36	57.9

STATISTICS OF LIVE STOCK

NO. OF LIVE STOCK ON HAND

The following tables give the number of horses, cattle, sheep, swine and poultry on hand in June of each year for the forty-five years 1882-1926.

Years	Horses	Cattle	Sheep	Swine	Poultry
	No.	No.	No.	No.	No.
1926	629,659	2,757,799	886,483	1,735,355	17,693,000
1925	644,138	2,809,373	868,526	1,678,595	17,778,581
1924	663,875	2,917,302	870,279	1,807,903	16,751,345
1923	673,371	2,838,087	907,673	1,734,734	15,203,384
1922	685,852	2,836,181	986,617	1,553,434	13,964,317
1921	694,237	2,890,113	1,081,828	1,563,807	11,458,206
1920	704,640	2,881,827	1,129,084	1,614,356	11,005,645
1919	719,569	2,927,191	1,101,740	1,695,487	11,705,809
1918	732,977	2,867,722	972,341	1,656,386	12,281,105
1917	765,873	2,827,609	956,986	1,664,639	13,606,292
1916	775,732	2,734,767	908,066	1,735,254	14,377,844
1915	779,131	2,674,746	908,095	1,769,295	14,273,091
1914	774,544	2,604,628	922,375	1,770,533	14,175,214
1913	751,726	2,628,845	996,155	1,618,734	13,511,383
1912	742,139	2,624,780	1,021,848	1,702,652	13,024,983
1911	737,916	2,593,205	1,040,245	1,744,983	12,942,293
1910	724,384	2,567,128	1,065,101	1,561,042	12,460,787
1909	728,308	2,668,584	1,130,667	1,551,187	12,086,580
1908	726,471	2,824,859	1,143,898	1,818,763	12,285,613
1907	725,666	2,926,236	1,106,083	2,049,666	13,428,076
1906	688,147	2,963,618	1,304,809	1,819,778	10,254,824
1905	672,781	2,889,503	1,324,153	1,906,460	9,738,493
1904	655,554	2,776,304	1,455,482	2,008,984	9,412,683
1903	639,581	2,674,261	1,642,627	1,977,386	9,683,573
1902	626,106	2,562,584	1,715,513	1,684,635	9,762,808
1901	620,343	2,507,620	1,761,799	1,491,885	9,745,236
1900	617,309	2,429,330	1,797,213	1,771,641	9,541,241
1899	615,524	2,318,355	1,772,604	1,971,070	9,344,024
1898	611,241	2,215,943	1,677,014	1,640,787	9,084,273
1897	813,670	2,182,326	1,690,350	1,284,963	8,435,341
1896	624,749	2,181,958	1,849,348	1,269,631	7,734,167
1895	647,696	2,150,103	2,022,735	1,299,072	7,752,840
1894	674,777	2,099,301	2,015,805	1,142,133	7,552,662
1893	685,187	2,057,882	1,935,938	1,012,022	7,114,436
1892	688,814	2,029,140	1,850,473	996,974	7,078,973
1891	678,459	1,978,815	1,693,751	1,156,316	7,006,090
1890	659,636	1,894,712	1,339,695	1,140,559	6,854,864
1889	618,795	1,891,899	1,344,180	835,469	6,304,298
1888	596,218	1,928,638	1,349,044	819,079	6,164,114
1887	575,361	1,948,264	1,396,161	832,817	6,438,361
1886	569,649	2,018,173	1,610,949	860,125	6,968,915
1885	558,809	1,976,480	1,755,605	822,262	6,336,805
1884	535,953	1,925,670	1,890,733	916,158	6,237,606
1883	560,133	1,828,613	1,868,784	906,727	5,847,344
1882	503,604	1,586,312	1,915,303	850,226	5,352,120

VALUE OF LIVE STOCK ON HAND

The following table gives the value of horses, cattle, sheep, swine and poultry on hand in June of each year for the forty-five years 1882-1926, except for the ten years 1882-1891 when farm live stock was valued in bulk.

Years	Horses	Cattle	Sheep	Swine	Poultry	Total
	$	$	$	$	$	$
1926	68,239,756	115,386,214	9,688,685	24,525,126	12,400,985	230,240,766
1925	69,787,791	115,844,069	9 576,722	24,424,238	13,527,454	233,160,274
1924	72,617,565	113,046,599	7,081,500	16,201,699	13,446,621	222,393,984
1923	74,542,351	109,467,066	6,597,087	19,018,668	12,401,083	222,026,255
1922	74,535,855	103,899,416	6,612,959	16,550,636	12,241,252	213,840,118
1921	75,680,750	103,861,565	8,207,564	19,205,488	11,168,318	218,123,685
1920	89,606,594	176,897,490	16,191,741	32,253,804	11,787,708	326,737,337
1919	92,823,683	184,041,594	18,128,240	33,263,051	11,351,364	339,607,932
1918	95,710,928	172,259,261	15,690,055	31,140,181	9,307,051	324,107,476
1917	99,439,558	150,309,828	9,946,030	21,464,366	8,517,195	289,676,977
1916	101,434,391	128,324,526	7,386,710	18,790,755	7,933,157	263,869,539
1915	107,982,037	115,363,336	6,403,907	17,562,726	7,670,326	254,982,332
1914	112,576,793	106,635,148	6,155,451	17,951,258	7,551,428	250,870,078
1913	113,240,047	95,759,022	6,242,672	15,393,192	6,956,952	237,591,885
1912	109,000,214	90,403,902	6,181,595	14,141,908	6,121,323	225,848,942
1911	103,373,206	84,634,962	6,213,021	14,593,917	5,905,318	214,720,424
1910	92,757,431	76,872,723	6,127,018	13,265,834	5,393,031	194,416,037
1909	87,682,689	75,247,197	6,262,493	11,144,135	4,411,386	184,747,900
1908	85,847,391	77,255,267	6,336,265	12,135,979	4,439,854	186,014,756
1907	85,041,144	79,485,780	5,928,325	14,174,502	4,854,381	189,484,132
1906	79,814,953	80,303,276	6,721,119	12,770,708	3,697,338	183,307,394
1905	73,911,177	76,764,482	6,191,774	12,280,667	3,335,660	172,483,760
1904	68,138,228	72,821,003	6,425,100	12,921,743	3,077,029	163,383,103
1903	61,811,456	69,289,924	7,228,498	13,023,743	2,973,646	154,327,267
1902	55,173,637	63,517,342	7,634,284	11,262,265	2,957,286	140,544,814
1901	50,038,465	59,527,119	7,772,793	9,298,712	2,859,172	129,496,261
1900	46,916,999	56,320,810	7,711,496	9,598,153	2,727,363	123,274,821
1899	42,713,557	52,938,500	7,315,729	10,180,338	2,658,321	115,806,445
1898	38,659,896	47,286,254	6,499,695	8,720,242	2,578,136	103,744,223
1897	36,111,805	42,683,557	6,003,194	6,533,210	2,318,038	93,649,804
1896	37,185,692	44,383,638	6,652,202	6,505,227	2,130,807	96,857,566
1895	40,283,754	46,708,017	7,708,442	7,101,211	2,156,623	103,958,047
1894	46,245,614	47,577,587	8,606,671	6,909,262	2,208,518	111,547,652
1893	50,527,472	47,718,025	9,016,118	6,622,129	2,187,158	116,070,902
1892	55,812,920	45,548,475	8,569,557	5,479,093	2,091,450	117,501,495
1891	....	....	....	....	....	108,721,076
1890	....	....	....	....	....	104,086,626
1889	....	....	....	....	....	105,731,288
1888	....	....	....	....	....	102,839,235
1887	....	....	....	....	....	104,406,655
1886	....	....	....	....	....	107,208,935
1885	....	....	....	....	....	100,690,086
1884	....	....	....	....	....	103,106,829
1883	....	....	....	....	....	100,082,365
1882	....	....	....	....	....	80,540,720

The values for several classes of horses on hand June 15th, 1926, were as follows: Stallions, $1,074,019; mares, $37,149,792; geldings, $27,206,104; colts and fillies, $2,809,841.

The values for the several classes of cattle on hand were as follows: Bulls, $4,247,466; cows for milk purposes, $75,727,088; cows for beef purposes, $4,079,695; yearlings for milk purposes, $7,185,629; yearlings for beef purposes, $7,801,951; calves, $7,312,229; all other cattle, $9,032,156.

The values for sheep and lambs on hand were: Ewes, for breeding, $5,333,154; one year old and over, $668,543; under one year, $3,686,988.

The values for brood sows, $7,521,543; six months old and over, $5,905,558; under six months, $11,098,025.

The values for the several classes of poultry on hand were as follows: Turkeys, six months old and over, $334,779; under six months, $415,951; geese, six months old and over, $353,311; under six months, $372,863; ducks, six months old and over, $124,358; under six months, $205,709; other fowls, six months old and over, $7,412,416; under six months, $3,181,598.

VALUES PER HEAD OF LIVE STOCK AND POULTRY ON HAND FOR THE YEARS 1892 TO 1926

Years	Horses All Ages	Cattle		Sheep and Lambs	Swine all Ages	Poultry all Kinds
		Milch Cows	Other Cattle			
	$	$ c.	$ c.	$ c.	$ c.	$ c.
1926	108	59 14	26 84	10 93	14 13	70
1925	108	58 55	27 70	11 03	14 55	76
1924	109	55 41	27 05	8 14	8 96	80
1923	111	55 24	25 14	7 27	10 96	82
1922	109	52 68	24 25	6 70	10 65	88
1921	109	51 56	24 77	7 59	12 28	97
1920	127	85 84	44 67	14 34	19 98	1 07
1919	129	88 71	46 37	16 45	19 62	97
1918	131	83 55	45 52	16 14	18 80	76
1917	130	75 54	39 55	10 39	12 89	63
1916	131	66 35	34 91	8 13	10 83	55
1915	139	60 83	32 18	7 05	9 93	54
1914	145	57 01	30 81	6 67	10 14	53
1913	151	50 56	27 29	6 27	9 51	51
1912	147	47 82	25 61	6 05	8 31	47
1911	140	45 31	24 07	5 97	8 36	46
1910	128	40 76	22 43	5 75	8 50	43
1909	120	38 19	21 45	5 54	7 18	37
1908	118	36 90	21 13	5 54	6 67	36
1907	117	36 43	21 15	5 36	6 92	36
1906	116	35 99	21 62	5 15	7 02	36
1905	110	35 06	21 29	4 68	6 44	34
1904	104	34 70	20 84	4 41	6 43	33
1903	97	34 15	20 58	4 40	6 59	31
1902	88	32 96	19 46	4 45	6 69	30
1901	81	31 74	18 57	4 41	6 23	29
1900	76	31 01	17 93	4 29	5 42	29
1899	69	30 31	17 41	4 13	5 16	28
1898	63	28 28	15 98	3 88	5 31	28
1897	59	26 13	14 58	3 55	5 08	27
1896	60	27 60	15 05	3 60	5 12	28
1895	62	29 74	16 08	3 81	5 47	28
1894	69	31 02	17 15	4 27	6 05	29
1893	74	31 63	17 78	4 66	6 54	31
1892	81	29 95	17 69	4 63	5 50	30

The values per head of the various classes on hand June 15th, 1926, were as follows:

Horses: Stallions, $306; mares, $112.94; geldings, $107.98; colts and fillies, $62.08.

Cattle: Bulls, $63.53; cows for beef purposes, $52.97; yearlings for milk purposes, $27.33; yearlings for beef purposes, $27.39; calves, $12.84; all other cattle, $41.79.

Sheep and lambs: Ewes for breeding, $13.07; one year old and over, $12.84; under one year, $8.65.

Swine: Brood sows, $37.68; six months old and over, $22.32; under six months, $8.73.

Poultry: Turkeys, six months old and over, $3.54; under six months, $1.11; geese, six months old and over, $2.33; under six months, 90 cents; ducks, six months old and over, $1.16; under six months, 47 cents; all other fowls, six months old and over, 96 ceuts; under six months, 38 cents.

VALUE OF FARM PROPERTY

LAND, BUILDINGS, IMPLEMENTS AND LIVE STOCK.

The following table gives the estimated values of farm land, farm buildings, implements (including vehicles) and live stock on hand on June 15th, for the years 1882 to 1926.

Years	Land	Buildings	Implements	Live Stock on hand	Total
	$	$	$	$	$
1926	871,177,637	493,551,144	164,478,485	230,240,766	1,759,448,032
1925	879,212,498	490,027,751	164,188,030	233,150,274	1,766,588,553
1924	885,348,351	484,539,016	164,021,854	222,393,984	1,756,303,205
1923	904,659,633	480,260,117	163,033,141	222,026,255	1,769,979,146
1922	880,896,544	479,451,680	163,830,154	213,840,118	1,738,018,496
1921	851,300,059	484,188,897	159,913,871	218,123,685	1,713,526,512
1920	861,116,234	467,010,867	153,780,378	326,737,337	1,808,644,816
1919	848,767,153	426,649,086	137,310,618	339,607,932	1,752,334,789
1918	819,164,298	380,244,880	109,896,874	324,107,476	1,633,413,528
1917	807,426,986	370,384,055	104,581,053	289,676,977	1,572,069,071
1916	794,676,866	357,313,850	98,020,295	263,869,539	1,513,880,550
1915	794,393,564	352,628,031	95,049,350	254,982,332	1,497,053,277
1914	790,538,706	347,348,643	91,703,876	250,870,078	1,480,461,303
1913	782,993,853	345,303,335	89,702,273	237,591,885	1,455,591,346
1912	758,729,268	335,141,520	86,231,210	225,848,942	1,405,950,940
1911	723,902,419	317,876,963	84,969,426	214,720,424	1,341.469,232
1910	700,905,425	306,517,941	81,570,981	194,416,037	1,283,410,384
1909	680,789,629	297,690,826	77,790,754	184,747,900	1,241,019,109
1908	671,531,018	288,180,121	74,485,730	186,014,756	1,220,211,625
1907	674,505,427	284,672,238	72,910,875	189,484,132	1,221,572,672
1906	661,199,920	273,414,187	71,197,619	183,307,394	1,189,119,120
1905	649,201,364	264,384,514	68,629,546	172,483,760	1,154,699,184
1904	640,544,541	257,995,484	65,992,210	163,383,103	1,127,915,338
1903	620,869,475	247,629,153	63,996,190	154,327,267	1,086,822,085
1902	604,860,063	237,289,668	62,199,787	140,544,814	1,044,894,332
1901	585,354,294	226,575,228	59,897,513	129,496,261	1,001,323,296
1900	574,727,610	219,488,370	57,324,130	123,274,821	974,814,931
1899	563,271,777	213,440,281	54,994,857	115,806,445	947,513,360
1898	556,246,569	210,054,396	52,977,232	103,744,223	923,022,420
1897	554,054,552	206,090,159	51,299,098	93,649,804	905,093,613
1896	557,468,270	205,235,429	50,730,358	96,857,566	910,291,623
1895	572,938,472	204,148,670	50,944,385	103,958,047	931,989,574
1894	587,246,117	204,071,566	51,530,172	111,547,652	954,395,507
1893	602,664,361	200,189,888	51,435,919	116,070,902	970,361,070
1892	615,828,471	195,644,258	51,003,020	117,501,495	979,917,244
1891	621,245,223	191,268,327	50,651,442	108,721,076	971,886,068
1890	622,886,000	193,438,826	50,515,583	104,086,626	970,927,035
1889	632,329,433	192,464,237	51,685,706	105,731,288	982,210,664
1888	640,480,801	188,293,226	49,754,832	102,839,235	981,368,694
1887	636,883,755	184,753,507	49,248,297	104,406,655	975,292,214
1886	648,009,828	183,748,212	50,530,936	107,208,935	989,497,911
1885	626,422,024	182,477,905	48,569,725	100,690,086	958,159,740
1884	625,478,707	173,386,925	47,830,710	103,106,828	949,803,170
1883	654,793,025	163,030,675	43,522,530	100,082,365	961,428,595
1882	632,342,500	132,712,575	37,029,815	80,540,720	882,625,610

PART II—CHATTEL MORTGAGES

Table showing by County Municipalities of Ontario the total number and amount of Chattel mortgages *on record and undischarged on December 31st, 1926, against (1) all occupations;* (2) farmers; together with totals for the Province in the past four years.

Counties and Districts	Chattel mortgages against all occupations				Chattel mortgages against farmers			
	To secure existing debt		For future endorsation		To secure existing debt		For future endorsation	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
		$		$		$		$
Algoma	147	337,997			67	57,596		
Brant	178	166,497			44	37,374		
Bruce	183	197,556			118	110,828		
Carleton	338	560,948	5	57,500	54	50,200		
Cochrane	263	268,610			263	268,610		
Dufferin	63	64,726			32	31,790		
Elgin	216	267,365			94	109,148		
Essex	351	417,557			110	139,828		
Frontenac	223	251,196			130	84,300		
Grey	258	295,847	2	27,000	139	127,586		
Haldimand	101	85,561			54	41,241		
Haliburton	18	9,773			14	3,823		
Halton	75	130,553			21	27,580		
Hastings	309	464,195	3	50,000	143	106,702		
Huron	143	166,125			83	93,007		
Kenora	39	205,316			14	4,756		
Kent	272	455,960			149	198,788		
Lambton	166	322,791			61	85,175		
Lanark	122	113,992			55	40,144		
Leeds and Grenville	265	275,427			193	180,905		
Lennox and Addington	112	298,198	1	500	67	73,692	1	500
Lincoln	137	237,864			50	72,684		
Manitoulin	96	86,752			77	45,486		
Middlesex	276	294,392			90	67,151		
Muskoka	109	198,246			33	13,867		
Nipissing	318	532,144			120	91,208		
Norfolk	158	159,704	2	1,540	93	77,357		
Northumberland and Durham	276	307,884			128	108,747		
Ontario	164	198,307			78	40,449		
Oxford	136	276,499			92	172,628		
Parry Sound	167	150,283			70	37,799		
Peel	75	92,225			35	34,861		
Perth	142	152,495			56	46,956		
Peterborough	152	181,315			55	34,365		
Prescott and Russell	223	226,817			141	106,635		
Prince Edward	125	136,992			87	66,077		
Rainy River	106	100,813			59	49,605		
Renfrew	215	353,001			130	155,748		
Simcoe	371	380,703			245	146,918		
Stormont, Dundas and Glengarry	303	475,243	14	11,025	230	284,000	9	5,984
Sudbury	367	467,219	2	20,500	198	136,158		
Thunder Bay	147	224,895			44	23,866		
Timiskaming	343	257,437	6	9,843	193	50,704		
Victoria	62	53,467	8	23,231	39	34,284	3	8,690
Waterloo	202	394,797			52	68,448		
Welland	149	141,152			31	11,354		
Wellington	178	288,617			78	121,983		
Wentworth	438	1,662,368	5	9,090	81	121,250	1	2,819
York	1,544	1,762,091			62	54,886		
The Province:								
1926	*10,821	15,149,912	48	210,229	4,552	4,148,547	14	17,993
1925	13,004	15,744,688	54	235,073	4,881	4,089,069	25	21,757
1924	13,268	14,886,953	34	212,743	4,981	4,323,812	10	14,098
1923	12,647	15,182,832	37	142,769	4,705	3,817,109	11	12,979

***The chief decrease in the number of instruments on record occurs in the County of York, where 3,221 were registered in 1925, aggregating $2,717,569.**

Ontario Department of Agriculture

ANNUAL REPORT

OF THE

Agricultural Development Board

FOR THE YEAR ENDING OCTOBER 31st

1926

PRINTED BY ORDER OF
HON. JOHN S. MARTIN, MINISTER OF AGRICULTURE

ONTARIO

TORONTO
Printed and Published by the Printer to the King's Most Excellent Majesty
1927

ANNUAL REPORT

OF THE

AGRICULTURAL DEVELOPMENT BOARD

FOR THE YEAR ENDING OCTOBER 31st, 1926

Toronto 5, March 24th, 1927.

DEAR SIR:—I have the honour to submit the Fifth Annual Report of the Agricultural Development Board for the year ending October 31st, 1926. From the information contained in the report, showing the absence of losses and a substantial surplus of earnings, it is appreciated that the past year has been a very satisfactory one.

The following is a statement of the loans granted since the inception of the Board:

	Number of applications passed	Amount of loans passed	Value of security	Number of loans paid out	Amount paid out
1922........	458	$2,040,605 00	$4,693,304 00	334	$1,188,000 00
1923........	953	3,729,350 00	8,685,166 00	776	3,000,000 00
1924........	990	3,582,150 00	7,871,026 25	819	3,200,000 00
1925........	892	3,246,680 00	7,197,300 00	701	2,700,000 00
1926........	1,119	4,028,300 00	9,089,008 57	831	3,200,000 00
	4,412	$16,627,085 00	$37,535,804 82	3,461	$13,288,000 00

As will be noticed the volume of business for the past year was the largest in any one year since the inception of the Board. No doubt an important factor contributing to this result was an action of the Government during the previous year, in reducing the rate of interest from 6 per cent. to 5½ per cent. The appreciation of this reduction by farmers of the Province is indicated by the increased number of applications. The Board is very glad to have been of service to such a large number. This reduction means a very substantial saving, not only the ½ per cent. but the larger percentage which would otherwise have had to be paid in the ordinary way.

While the number of loans granted has shown an increase, there was still a larger number considered. The fact that 276 applications were not granted is an evidence of the careful scrutiny which is given each application in order to adequately safeguard the interests of the Province.

At the close of the last fiscal year the Board reported that seven of the twenty-four properties which had been turned over to the Board during the year through process of law, remained undisposed of. During the past year twenty-one properties have passed into the possession of the Board. During the year, however, twenty-five properties have been sold, so that with the close

of the year there remained only three undisposed of. The properties sold aggregated a substantial sum in addition to the amounts due the Board. It has always been the policy of the Board to turn such surplus over to other persons having the next claim on any such equity. It will be apparent, therefore, that although the number of farms on our books was considerably larger than during the previous year, the number foreclosed was less and more prompt arrangements for a sale were completed. These facts are not only a satisfactory record from the business standpoint but indicate a healthy condition of agriculture in general.

The record of repayments also continues satisfactory. Previous arrears having been cleaned up, the following table will give the amounts at the present time outstanding:

Due date	Amount due	Amount uncollected	Percentage uncollected
December 1st, 1924	$286,174 11	$4,554 85	1.59%
May 31st, 1925	278,982 77	3,700 43	1.33%
December 1st, 1925	380,075 20	23,729 97	6.24%
May 31st, 1926	362,425 18	54,347 22	14.81%

A comparison of the percentages outstanding with those in the previous year shows a striking similarity. The larger amounts are, of course, only overdue by a few months. There is apparently good security in each case and payment will be forthcoming.

The collections have been sufficient to enable the Board to meet all payments due the Treasurer of the Province on bonds and debentures. All payments have been met promptly when due. In addition to the payments on interest, approximately $1,000,000 has been paid on principal for the retirement of debentures.

In addition to these payments on what may be described as capital account, the earnings of the Board are in excess of the expenditures for maintenance or current account. As was pointed out in our last report, the revenue from inspection and legal fees has been turned over each year but the revenues from the one per cent. margin of interest have been allowed to accumulate to the credit of the Board, as such a plan is necessary in the successful operation of the Board. During the past year, however, the Board was able to forward a cheque for $100,000 to the Treasurer as additional revenue from this source. After this payment is taken out, there still remains to the credit of the Board, a surplus of $179,832.22 which includes a surplus of $57,032.90 made on the operations of the past year. It will be noted from the financial statements hereto attached that the total earnings of the Board are in excess of the total expenditures since its inception, to the sum of $113,176.72.

Short Term Loans

Details of the present situation in regard to Short Term Loans are found

$48,517.39 and new loans have been granted to the extent of $24,713.10. The total amount outstanding is $175,940.08. Interest payments have been well maintained, the arrears being only $802.59.

All of which is respectfully submitted.

Yours truly,

AGRICULTURAL DEVELOPMENT BOARD,

A. G. FARROW,
Chairman.

The HONOURABLE JOHN S. MARTIN,
Minister of Agriculture,
Parliament Buildings, Toronto.

AGRICULTURAL DEVELOPMENT BOARD

A. G. FARROW, Chairman; W. B. ROADHOUSE, Deputy Minister of Agriculture; T. R. JENNINGS, Assistant Auditor.

BALANCE SHEET

Twelve Months Ending October 31st, 1926

ASSETS

Mortgage loans		$12,191,375 03
Accrued interest		393,253 59
Sundry interest charges—		
Mortgages		44,130 07
Office equipment		2,066 61
Bank of Commerce—		
Current account	$117,255 90	
Capital account	5,991 67	
		123,247 57
Provincial Savings Office—		
Insurance Loss account		10,091 86
Revenue Fund account		33,575 90
Advance Payments account		789 40
Register of Receipts balance		2,202 12
Provincial Treasurer Debenture No. 131		75,000 00
		$12,875,732 15

LIABILITIES

Bonds 3, 4 and 5		$200,000 00
Debentures 1 to 131—Less 5 cancelled and 5 paid		12,100,000 00
Accrued interest		377,140 02
Sundry credits	$420 29	
	7,458 36	
		7,878 65
Advance payments		789 40
Insurance Loss account		10,091 86
Provincial Treasurer		66,655 50
Suspense account		56,143 82
Balance (surplus on operation for year)		57,032 90
		$12,875,732 15

EXPENDITURES AND EARNINGS

Twelve Months Ending October 31st, 1926

Inspection		$23,340 41
Salaries		44,504 63
Stationery and supplies		2,106 96
Postage, telegraph and telephone		2,010 88
Sundries		377 29
Legal sundries		2,782 26
		$75,122 43
Office equipment—Depreciating 5 per cent. on $2,175.38		108 77
Farm properties	$124 46	
	2,579 04	
		2,703 50
Accrued interest—Bonds and debentures		502,078 88
Balance (surplus in operation for year)		57,032 90
		$637,046 48

Interest on loans for 12 months		$584,431 45
Inspection fees		15,492 00
Board legal fees		14,212 46
Bank interest and exchange	$26 75	
Bank Interest—		
Current account	8,191 89	
Capital account	653 42	
Sinking fund account	14,038 51	
		22,910 57
		$637,046 48

1925–1926

Bonds and debentures at beginning of year	$10,052,000 00		Mortgages at beginning of year	$9,584,176 21	
Bonds and debentures issued during year	3,200,000 00		Advances	3,272,736 63	
	$13,252,000 00			$12,856,912 84	
Bonds and debentures paid during year	952,000 00		Repaid	665,537 81	
		$12,300,000 00			$12,191,375 03

FARM LOANS—SHORT TERM

Association	No. of Borrowers		Loans Oct. 31, 1925	New Loans	Principal Received	Interest Due	Interest Received	Loans Oct. 31, 1926
	Oct. 31, 1925	Oct. 31, 1926						
Balfour-Rayside	29	20	$8,829 65	$1 60	$3,332 35	$881 70	$881 70	$5,498 90
Cosby-Martland	14	5	2,669 16	....	1,713 76	203 18	203 18	955 40
Downie	15	11	9,880 00	....	5,918 47	584 87	534 56	3,961 53
Ekfrid	21	21	12,011 69	500 00	1,330 00	778 29	778 29	11,181 69
Esquesing	19	15	15,771 64	....	3,820 92	1,088 61	991 11	11,950 72
Glanford	10	8	8,952 56	200 00	4,176 82	635 34	635 34	4,975 74
Howard	16	15	7,137 78	....	1,164 50	412 60	412 60	5,973 28
Mosa	19	17	12,210 00	2,500 00	2,425 00	723 39	723 39	12,285 00
Nassagaweya	22	20	12,539 51	11 50	3,010 57	860 46	860 46	9,540 44
Nelson	18	20	14,225 00	5,700 00	2,575 00	1,078 87	1,078 87	17,350 00
North Grimsby	24	24	15,975 13	3,550 00	3,230 45	1,594 78	940 00	16,294 68
Roxborough	21	18	15,950 00	....	4,595 94	958 44	958 44	11,354 06
Sault Ste. Marie	17	13	6,160 00	2,150 00	2,121 61	364 90	364 90	6,188 39
Seneca	7	9	3,250 00	1,400 00	300 00	218 25	218 25	4,350 00
Toronto	19	19	17,325 00	3,000 00	5,850 00	1,047 85	1,047 85	14,475 00
Trafalgar	39	42	36,857 25	5,700 00	2,952 00	2,144 73	2,144 73	39,605 25
	310	277	$199,744 37	$24,713 10	$48,517 39	$13,576 26	$12,773 67	$175,940 08